THE IRON TRADE REVIEW

VOLUME XXVII. CLEVELAND, O. NOVEMBER 22, 1894. CHICAGO, ILL. NUMBER 47

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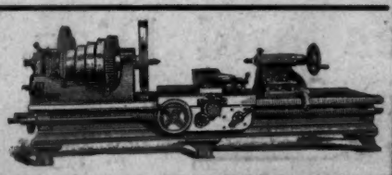

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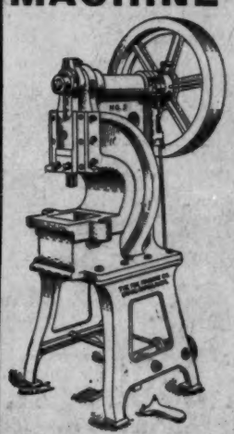

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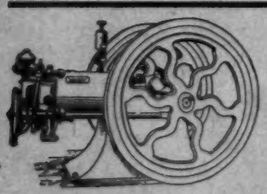

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THE IRON TRADE REVIEW

VOLUME XXVII. CLEVELAND, O. NOVEMBER 22, 1894. CHICAGO, ILL. NUMBER 47.

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The probability, amounting almost to a certainty, that higher prices will be paid in 1895 for coke and for Bessemer ores; the fact that up to Nov. 1 stocks of pig iron had been decreasing slightly in the face of steadily increasing output that reached a yearly rate of nearly 8,500,000 tons on that date; the further fact that any noticeable increase of Bessemer pig iron consumption will call into activity furnaces which must have a higher price for their iron than that ruling to-day—these are the prime elements in any forecast of the iron and steel situation that reaches into the coming year. Related to these facts is another one—the country's consumption of steel in the past few months has been at a rate never equaled in its history, with the railroads, once a main stay of the steel mills, buying less than in the disastrous second half of '93. Much store is set by producers on the effect, in such a situation, of even a moderate run of buying by the railroads. There is little question about the attitude of Lake Superior ore producers next year. The winding up of another season's shipping has brought home forcibly the fact that a year's output of ore has gone, without a cent of profit. It is the consensus of opinion in that industry that the experience will not be repeated. The Connellsville coke producers are in a similar position; their policy for the new year will not much longer be in doubt. In the week just past there has been practically no change in markets. In the east there was considerable buying by consumers immediately after the election and to-day neither side is pushing negotiations. Prices are steady and while there are some buyers of pig iron who would be willing to contract for '95 deliveries on the present basis, sellers prefer not to go beyond January. Some Eastern inquiries are out, on bridge and structural account, but business closed in finished material is not more than keeping pace with the current output of the mills. At Pittsburg there has been light buying in Bessemer pig and steel billets, with the weakness attending the close of the year. Some sales of Bessemer are reported at $10.65 and in a few instances $10.50 has been touched. Billets are sold by brokers at $15.40@$15.65. Makers refuse to sell at the lowest prices talked of. Chicago reports a sustained demand for Northern foundry iron on the low basis lately prevailing; sales of Southern iron are still light.

THE CLEVELAND OUTLOOK.

The last ore cargoes are on their way to Lake Erie docks. Frozen ore has made the fag end of the season's work exceedingly trying at upper lake ports. Arrangements for winter operations are being made at the mines; on the Mesabi and Gogebic ranges, winter work promises to be more extensive than that of a year ago. There is some sale of Bessemer ore all the time, but only in small lots. Standard Bessemer hematites are in limited supply; and the unsold Bessemers of any description are not a large total. The general ore outlook for the coming year is discussed in some of its phases in another column.

Pig Iron. Foundry pig iron has shown unusual activity in this market in November. It is evident that whatever the conditions in the East, work is more plentiful in Western foundries and buyers are recognizing that at the low prices prevailing they are doing a good thing in covering their requirements as far into the new year as furnaces are willing to contract. The probabilities of higher ore and coke in 1895 seem to have made an impression on foundrymen buyers, as well as furnacemen. Yet the buying movement of the past two weeks has not helped prices. Weakness is still very noticeable. The $10 and $10.50 for No. 2 and No. 1 irons at furnace, that have been held on small lots have been shaded in a number of cases, and some pretty heroic cutting is reported in connection with sales of No. 2. The concessions from open freight rates on Southern iron, referred to a short time ago, are still being made; the prices named on gray forge and Southern soft for delivery in this territory are much below what any furnace could stand, paying the quoted rate from Birmingham. An Ohio agricultural concern bought 1,000 tons of Southern iron last week. Northern bidders refused to make deliveries as far ahead as August. The Bessemer pig market presents the conditions noted last week. Most valley furnacemen are piling iron rather than sell at $9.75 and $9.85 furnace, offered by brokers. Sellers have been canvassed the past week by a broker asking offers on a large lot of iron to be delivered in February and three months following. It is understood that a steel company is represented by this inquiry. In one case $11 at furnace was bid. In spite of present accumulations, makers of Bessemer are quite firm in the belief that an advance will come early in the year. There has been some business closed but on what basis is not known.

Finished Material. Prices are weak in every department of the market for mill products. Pittsburg took an Ohio agricultural works contract for boiler plates the past week, and Youngstown got the bar iron and steel. One bridge inquiry representing considerable tonnage is in the market, and another one of good proportions is just ahead. While large work is scarce there is a good volume of small inquiries. It is known that recent steel rail orders have been much more satisfactory to the mills and that inquiries are coming in for the new year. The Cleveland market has an interest in a further heavy tonnage of Harlem bridge work recently let by the New York Central.

THE CHICAGO OUTLOOK.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

The cheerful feeling noted last week still prevails, and if anything, is more accentuated than before. Sales are not increased, but there seems to be every probability that the first of the year will see a largely increased business, and in fact, in some lines the inquiry for delivery in 1895 is quite large already. Crude material is in excellent demand and is selling well. Finished material is not having quite as good a sale as crude, but still is doing quite as well as could be expected at this season of the year.

PIG IRON.—The market is in excellent shape and sales of local iron are quite as large as is usual at this time of the year. A sale of 1,200 tons, three of 1,000 tons, and several of 500 tons, together with a good trade in small lots is reported. Prices are unchanged, except that one furnace, whose product is hardly up to standard grade, has been making very low quotations, that have to some extent influenced the market. The inquiry is still large, and it is likely that several good lots of iron will be disposed of in the present week. Southern iron is quieter, and sales range from carloads to 200 and 300 tons, with a fair aggregate. Prices are being maintained rather better than has been the case of late, and not so many charges of cutting are heard. Lake Superior charcoal is quiet, with sales limited to carload lots. Our quotations are as follows:

Lake Sup. Charcoal	$13 00@14 50	Southern No. 2 Soft	10 00@10 25
Local Coke Fdy. No. 1	10 25@10 50	South'n Silveries No. 1	$11 50@11 75
Local Coke Fdy. No. 2	9 75@10 00	South'n Silveries No. 2	11 25@11 50
Local Coke Fdy. No. 3	9 40@ 9 65	Jackson Co. Silveries	15 00@16 00
Local Scotch Fdy. No. 1	10 25@10 50	Ohio Silveries No. 1	14 00@14 50
Local Scotch Fdy. No. 2	9 75@10 00	Ohio Silveries No. 2	13 00@13 50
Local Scotch Fdy. No. 3	9 40@ 9 65	Ohio Strong Softeners	13 00@13 50
South'n Coke No. 1	11 00@11 25	Alabama Car Wheel	17 50@18 00
South'n Coke No. 2	10 25@10 50	Malleable Bessemer	10 50@11 25
South'n Coke No. 3	10 00@10 25	Coke Bessemer	11 25@11 50
Southern No. 1 Soft	10 25@10 50		

BARS.—Business has been in much better shape in the past week, and not only have some good sales been made, but inquiries for delivery after the first of the year are coming up all the time. One buyer even went so far as to ask for prices on 1,000 tons for delivery during the whole of '95, but could find no mill willing to sell, except at considerably advanced prices, beyond July 1, '95. Several sales have been made for deliveries running through the first half of next year, and it is likely that others will be closed soon. Prices so far, are unchanged, although there is a much stronger feeling among manufacturers. Quotations are made at 1.05c. for common iron, 1.15c. for guaranteed, and 1.25c. for steel bars.

RAILS AND TRACK SUPPLIES.—It is expected that the local mills will be shut down not later than Dec. 15, as their orders will hardly keep them running to the end of the year. Inquiries are being received, however, for large quantities of rails for delivery in January and later, and it is not likely that the mills will remain closed down after Jan. 1. Prices are unchanged, as follows: Rails, $25 to $27; splice bars, 1.25c to 1.30c; track bolts, 2c. to 2.10c; spikes, 1.75c. to 1.80c.

STRUCTURAL MATERIAL.—The bids for the three bridges over the drainage canal were all rejected last week, and new bids asked for, as it has been decided to substitute stationary bridges for the swing bridges originally proposed. Aside from this there is nothing new, the market being quiet. Quotations are still made as follows: Beams, 1.45c; angles, 1.45c; plates, 1.45c; tees, 1.65c. Small lots from stock are quoted at ¼c to ½c higher.

BILLETS AND RODS.—The demand for billets for delivery in the first half of '95 is increasing, and while as yet no sales have been made, it is probable that selling will commence soon. Quotations are still made at $17. Rods are also in good demand, for delivery during the first three months of next year, although as yet no sales have been made. Prices are made at $23.50.

PLATES.—The demand is better, particularly for delivery after Jan. 1, and some sales have been made. Prices are unchanged, but are rather firmer: Tank steel, 1.40c to 1.50c; flange steel, 1.65c to 1.70c; firebox steel, 1.75c to 5c; boiler tubes, 75 per cent. discount.

MERCHANT STEEL.—Good sales have been made, both from mill and store, and the demand is considerably better. Quotations are firm and unchanged. Open-hearth spring, tire and machinery steel, 1.75c to 1.80c; smooth finished machinery and tire, 1.50c. to 1.60c.; Bessemer bars 1.40c. to 1.45c.; tool steel, 5.50c to 7.50c.; specials, 11c. and upwards.

SHEETS.—The demand for black sheets continues to improve and there is especially a good demand for delivery after Jan. 1, and several good orders have been closed. Prices are made on a basis of 2.40c. for No. 27 common iron; steel sheets are quoted at 2.45c to 2.50c. Galvanized sheets are in fair demand only, and are quoted at 75 and 10 and 5 to 75 and 15 per cent. discount.

OLD RAILS AND WHEELS.—Old material is quiet as regards sales, but an excellent demand is reported for old steel rails. Old wheels $10; old iron rails $11.25; old steel rails, $7.50 for short and $10.50 for long lengths.

SCRAP.—The market is rather quiet, although there is a good demand. Prices are as follows: No. 1 forge, $8.50 to $9.00; No. 1 mill, $7; No. 1 machinery, $7.50; axles, $13.50; cast borings, $3.50; wrought turnings, $5.00; axle turnings, $6.50; mixed steel, $5.50; heavy cast, $7 to $7.50; stove plates, $5 to $5.25; heavy melting steel, $7 to $7.25.

IN OTHER MARKETS.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Pittsburg. There is a disposition among merchant furnaces producing Bessemer iron to stack their product rather than make sales at the prices now talked of. They argue that the combination of cheap coke and cheap ore which has enabled them to get out whole on the low price basis of this year will not last much longer, and that $9.85 at valley furnace will be bettered before contracts taken now for forward deliveries could expire. There is nothing definite from the Connellsville coke interest, though furnacemen find indications that something may come to pass about Jan. 1 that will put a different aspect on the market. Some sales of Bessemer are reported at $10.50 and $10.65 the past week, but it is difficult to find furnacemen who will admit that they have accepted the former figure. The purchases made are mostly through brokers' offices. The condition of stocks, on the face of the heavy production in this and nearby districts, reinforces furnacemen in their view that after the turn of the year, there will be a firmer market. Forge iron continues weak; foundry grades are likewise uncertain in price. No definite decline has taken place since the last report, but there is a lack of firmness among holders that encourages buyers to work one seller against another. Some concessions have resulted from the fear that business will get away. There is considerable confidence in regard to the finished material market. While no large contracts are placed, there are a good many small orders. The billet market still presents the condition of leading producers refusing to sell at the prices going and of brokers making offers to sell for December delivery at $15.50 and lower. Mill prices are $15.60 to $15.85.

Little steel is sold for the new year. Structural demand is fairly well maintained; on beams and channels the range is 1.20c. to 1.35c. according to quantity and widths. Steel rail inquiries are of larger volume but it is plain that the large output of Bessemer iron that has been taken up in the past three months has gone to a very small extent into railroad needs.

Buffalo. There is without doubt an improvement in the demand for foundry iron, and during the past week several good sized orders have been placed which were distinctly traceable to the influence of the election. The impression prevails quite generally hereabouts, that an end has been made to agitation and radical changes, and that business will consequently gradually or otherwise return to its normal condition. To this belief is probably traceable a number of inquiries for long forward delivery, which have also come to the surface since the election. So far but few of these have resulted in business, owing to the reluctance of producers to sell very far into next year without an advance over present prices. Meanwhile, for early delivery, there is no change in quotations.

St. Louis. The week has been more than usually quiet, no large transactions being reported. The disposition is to wait until after Jan. 1st inventory before laying in much in the way of stocks. The general tone of business is hopeful and healthy.

Cincinnati. The market in crude iron has ruled quiet throughout the week. There are evidences of gathering strength, at least of enlarging consumption, but the indications are that there will be no important increase in buying until after the first of January. It is regarded as a remarkably healthy sign that there should be little or no increase of stocks, while the list of active furnaces is so large, and important lines of consumption such as car building, railroad equipment, agricultural implement work, building work, etc., are so much restricted. The impression is common among buyers that there is unlimited idle furnace capacity in the country, which awaits only a slight improvement in the market to go to producing iron. The facts are quite the reverse. In the entire district where Connellsville coke and Lake Superior ores meet, every really available furnace is making iron to its full capacity. In the South, while there are many idle stacks, it is nevertheless true that production is nearly, if not quite at the maximum limit. An improvement in demand and prices could only increase output to a limited degree, because the facilities for getting out ore, producing coke and handling the great mass of material required to operate so many furnaces are already taxed very nearly to the limit. The fact remains, however, that prices are weak and there is a good deal of pressure to sell both Northern and Southern brands. Furnaces are unwilling to make engagements running far into next year without an advance in prices, believing that there will be import- and changes for the better soon after first of the year.

Chemical Constitution and Strength of Steel.

In a paper read before the British Iron and Steel Institute, a paper to which Mr. P. C. Gilchrist, a member of the Council, refers as "one of the most important ever received by the Institute," Mr. William R. Webster, member of the Engineers' Club of Philadelphia, gives the very valuable results of tests upon more than 1000 plates of basic Bessemer and basic open-hearth steel manufactured by the Pottstown Iron Co., and tested upon an Olsen machine at that establishment.

The chemical determinations were made on drillings from the broken test-pieces. The investigations cover the effects of carbon, sulphur, phosphorus and manganese upon the ultimate strength of the steel. They indicate that ⅜-inch plate of pure iron without carbon, sulphur, phosphorus, manganese or silicon, would have an ultimate strength of about 34,750 pounds per square inch, and the tables give the added strengths imparted by varying proportions of the elements referred to.

Carbon is found to increase the strength about 800 pounds per square inch for each 0.01 per cent. In steels containing 0.07 to 0.08 of carbon, phosphorus also adds 800 pounds for each 0.01 per cent., but the effect of the phosphorus increases with the percentage of carbon, until in steel with 0.15 of carbon, 0.01 phosphorus adds 1,500 pounds per square inch. Steel with 0.15 per cent. of manganese has 3,600 pounds per square inch higher tensile strength than steel free from manganese, but the effect of equal additions of manganese decreases as its percentage increases, so that when the percentage of manganese reaches 0.50 per cent., the increase in ultimate strength for an addition of 0.15 per cent. is only 1,500 pounds per square inch.

Sulphur is credited with a constant effect of 500 pounds for each 0.01 per cent., but the effects of this element are still being carefully studied. The indications are that the ultimate strengths of plates with high carbon and high phosphorus are more affected by the finishing temperature than are those with small percentages of these elements.

The practical results of the experiments are most satisfactory. The figures used are in current use at the Pottstown works, and out of the last one thousand blows graded by means of them, 98 per cent. met the requirements of the orders and were accepted. The author, who has treated of this subject in papers read before the American Institute of Mining Engineers, August, 1892, and July, 1893, refers in high terms to Mr. H. M. Howe's recent experiments on the heat-treatment of steel, and to the investigations of Mr. Mr. A. Lanz, of the Peine Works, upon the effect of oxygen in increasing the hardness and decreasing the ductility of steel.

1893 Costs for Steel Vessels Can't Be Duplicated.

Although orders for new ships to be built on the lakes during the coming winter are very limited, the builders of steel vessels are not prepared to duplicate prices for which they offered to build large freight carriers at this time a year ago. The difference may not be very great, but builders look to the probability of somewhat higher prices for material, and the chance also of an increase in labor cost. Take for instance the steamer Nicholas, owned by the Minch estate of Cleveland, and which was probably constructed with less profit to the builders, the Cleveland Ship Building Co., than any other large steel steamer ever built on the lakes. She was built for $150,000, but sales of stock have since been made on a basis of $155,000. It is not at all probable that the builders of this boat would accept the former price, although it cannot be said that they have stated anything to the contrary. The Globe Iron Works Co. has fixed a price on the steamer Globe, which went into commission a few weeks ago, and they are holding for the figure decided upon, with every prospect of securing it, on account of the favorable reception that the boat has received among people who know a good ship when they see it, and also on account of the change for the better in conditions bearing upon lake freights. Of course the price asked for the Globe is not made public, but it is understood to be in the neighborhood of $170,000 cash.—[Marine Review.

THE complete novel for the December issue of *Lippincott's* is "Mrs. Hallam's Companion," by the well-known Mrs. Mary J. Holmes. A short story by the author of "Dodo" will attract general attention. Mr. E. F. Benson has written nothing better than "A Creed of Manners." Dr. Charles C. Abbott's account of "An Odd Neighbor" reads like truth rather than fiction. True, too, and historical, are Charles Howard Shinn's recollections of "Don Jaime, of Mission San José."

PRESIDENT GARLAND, of the Amalgamated Association, says there are not enough idle tin workers in the United States to fill all the positions in one mill and that any Welshmen who might come over would be strong union men.

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NOVEMBER 22, 1894.

LAKE SUPERIOR ORES IN 1895.

The most disastrous year in Lake Superior iron mining is about at an end. To most mining companies it has been a year devoid of profit; some will find the balance on the wrong side, if they do what proper book-keeping requires and charge up against every ton of ore taken out in 1894 its share of dead-work. It is not surprising that with such a record now practically made up, the iron ore interest addresses itself earlier than usual to the probabilities of the season just ahead. Will 1895 bring a repetition of the untoward conditions of 1894? Will Lake Superior mining companies continue for another year the policy of virtually giving away millions of tons of valuable ore that can never be replaced? How will the old range properties be affected by the Mesabi's output, which it is conceded can easily be made twice that of 1894 and more should the market call for it? Will the difference in price be more pronounced than in 1894, between Mesabi and old range ores, of like chemical constituency? What has a year's furnace practice with Mesabi ores developed as to the percentage that can be used most advantageously? These are some of the questions that are being canvassed.

Every forecast for 1895 will take account first of all, of the indications that the requirements of Bessemer ore in that year will be greater than in any year preceding, and that the call for non-Bessemer will be the smallest in years. This is familiar ground and the reasons have been frequently stated. Aside from the enroachment of steel upon iron, lumber has been rapidly displaced by steel sidings and steel beams. Steel railroad ties displace wooden ties; steel pit posts are going into mines—but the story is too familiar to repeat. The point is that 7,000,000 to 8,000,000 tons of Lake Superior Bessemers are likely to be required in 1895 if the expected pace is attained, in the country's gradual return to normal consumption. The non-Bessemer output—about 1,000,000 tons this year—is likely to be less in 1895; at all events it need not be considered in this connection. In 1892, with a total production of 4,444,041 gross tons, of Bessemer pig, upwards of 7,000,000 tons of Bessemer ores were consumed, of which the Lake Superior contribution was about 5,500,000 tons. With nearly 6,000,000 tons of Lake Superior Bessemers shipped in the season just closing, it can be appreciated that an 8,000,000-ton prediction for next year is not over sanguine, if no industrial set-back intervenes.

As to the Mesabi's share of the Bessemer total: Furnace operations in the Mahoning and Shenango valleys and the Pittsburg and Wheeling districts the past year have furnished valuable data. Many furnacemen have confirmed the judgment expressed after last year's trials, that 25 per cent of Mesabi ores is the limit that can be used with any assurance of satisfactory working. The determination of this matter is not a little complicated. Some furnaces whose owners are interested in Mesabi properties have used large percentages of the fine ore. The achievement of one Pittsburg furnace, using 66 per cent of Mesabi Mountain is well known. It is to be expected that where engagements as to minimum ore royalties must be met, the ore taken out will be used to the fullest extent consistent with safety and ultimate economy. If there is a more rapid deterioration of the furnace property under very high percentages of Mesabi ores, that fact must be reckoned in computing economies. If the danger from explosions is increased, that fact will be seriously weighed. Thus far merchant furnaces, whose owners have no interest in the Mesabi range, have stopped at 25 per cent. It need not be assumed, however, that this experience is final. The question of cost cuts an important figure. If there is a distinct economy in a mixture carrying a considerable percentage of Mesabi ores, it is to be expected that the furnaceman will find ways of overcoming the difficulties that have thus far held him close to the 25 per cent limit. It would not be surprising if furnace lines are changed, when renewals are made, and practice adapted more and more to the cheaper ores. It is known that inventive furnacemen have already devised means for lessening the number and the destructiveness of explosions, the liability to which is increased by large percentages of fine ores.

If it be true, as good authorities affirm, that general practice up to date draws the line at 25 per cent, and that the larger amounts used by Mesabi investors are nearly offset by the lower percentages of some furnace companies, the requirements of Mesabi Bessemers in 1895 would be in the neighborhood of 2,000,000 tons. Representatives of old range properties who have canvassed valley and Pittsburg furnaces lately are confident that for next year, at least, whatever the future may develop, they will be called upon for about 75 per cent of the Lake Superior Bessemer ores that go into consumption. If it were known to-day that three tons of old range Bessemer ore would be bought next year to one of Mesabi, the relation between the two standards of unit values would be pretty well determined. The old ranges have never sold 6,000,000 tons of Bessemer ore in a single year. To get out that much, in the present condition of their Bessemer properties would tax to the utmost the capacity of mines producing standard Bessemer hematites. As for hard Bessemers, there is very little change in the attitude of furnacemen toward them. Such mines as have crushed their ores have been able to retain a trade that might have followed the drift toward soft ores. There has been one factor of encouragement, moreover, to hard ore producers, in the testimony of some furnacemen that they have got excellent results by using hard ores in conjunction with those of the Mesabi.

It is becoming plainer as each year's quota is being taken out of the ground, that the amount of standard

Bessemer hematites in sight is limited. A leading producer, that has furnished the largest factor in the mixtures of important furnace firms, has only 2,000,000 to 2,500,000 tons in sight. Diamond drilling has revealed an ore body at a lower depth, but to sink shafts and to mine it means of course a greatly increased expense. On the ore that remains in this and other hematite mines, it is the settled purpose of the producers to get a profit. And while standard Gogebic Bessemers have been sold this year at $2.75, it is intimated that $3.25 to $3.50 will be asked in 1895. Wages at the mines have been on a level that means mere existence. Wages on the lakes have touched bottom. Owners of vessel property have been fortunate if they have made enough to cover depreciation; it is certain that some have not done that. It can be seen that even a little increase in these several directions, with an allowance for a profit to the mining company, will be attended with a distinct advance above the price level of the present season.

As to the Mesabi properties, it is well known that most of them have been worked this year without a profit. There has been some revising of cost estimates, even on the cheapest steam shovel mining, as a result of this season's operations. On a 50-cent royalty, with 80 cents for lake freight, 80 cents from the mine to the lake, 15 cents for taxes, interest, insurance and commission, and 35 cents for mining, the absolute cost of a Mesabi Bessemer is $2.60. Very little ore from that range has brought over $2.50 the past season; some of its second grade Bessemer has been sold at $2.25 and even less. The two strongest companies on the range have not hesitated this year, to make a price that would get the ore well upon the market. If they adopt a money-making policy next year, a firmer market may be the result. But with the ability to produce 4,000,000 tons of ore next year, and three roads to take it to the docks, there is not the best outlook for good prices, if only 2,000,000 tons should be called for. The Mountain Iron, with no royalty to pay, is the cheapest producer unquestionably, but the fact that a portion of its product is non-Bessemer adds to the cost of the Bessemer, for it is a practical certainty that a Mesabi non-Bessemer cannot now be sold to realize cost. The 80-cent rail rate has been a handicap to the independent producers of the new range. Their royalties, even with the reductions made, have been higher than they could pay on such a market. Their minimum outputs, moreover, have compelled in some cases a large output that has a bear influence on the market.

The situation has in it many uncertain elements, whose value will be determined by the events of the next four or five months. This much seems certain, at least—that the two standards of unit values—the old range and the Mesabi—will show a greater difference in 1895, and that standard Bessemer ores will not go upon the market except at a fair profit to the producer.

NORTHERN VS. SOUTHERN FOUNDRY IRONS.

More than five months have passed since the development, particularly in the Northwestern market, of indications that makers of Northern foundry irons were successfully beating back the tide of competition from the South. In the Chicago market, the heavy buying in June was almost exclusively of Northern irons. Since that time, week by week, the story has been re-told—an almost entire absence of sales by Southern producers. Even the customary requisitions for Southern softeners have been greatly reduced, while contracts have been closed with Northern furnaces, at low prices, for soft irons, in the face of claims on one side, that a proper mixture for successful work could not be made with pig iron from all-Lake-Superior ore. In commenting last July on the elements in this contest, as they had then developed, *The Iron Trade Review* said:

> The question of quality enters to some extent into this contest. The conditions in that respect are not widely different. Yet there is without doubt less disposition than ever among foundrymen to regard brands or locality names, or shop traditions, in buying their irons. The idea that pig iron made from Lake Superior ores will not fill all the requirements of the foundryman, whether his output be light gray iron or machinery castings, is passing away. The red shortness of iron made exclusively from low phosphorus Lake Superior ores can be readily corrected by the employment of such high phosphorus ores as are found in certain Crystal Falls mines on the Menominee range, for example, and mill cinder at all times puts the corrective in the hands of the furnaceman. It was noted in the recent pig iron sales in Chicago that even Southern softeners were not in demand. It has been common practice, in making light gray castings, to secure the necessary fluidity by the use of these softeners, and in the satisfactory handling of sprues and miscellaneous scrap, they have come to be regarded as indispensable. Northern furnaces using Lake Superior ores exclusively, seem to be making it more of a study to furnish the foundryman with irons meeting all his wants and supplying his mixture complete.

It has become more and more evident in the five months of buying, since the above was written, that price is with the very large majority of foundrymen the controlling consideration. The foundryman is much less dependent to-day than ever before, upon the salesman with a mixture. There is so little regard for traditions and names among progressive buyers of foundry irons, that it would be a hard matter to convince them that they could not get along without a certain proportion of Southern iron; and just as difficult to persuade them that Northern iron, in greater or less proportion, is indispensable to their practice. Before Southern irons came into the market, castings of all descriptions were made from all Northern irons. And since Southern irons have made a place for themselves against much evil report there are foundries here and there that depend upon them altogether. The Southern irons that are large scrap carriers can be duplicated by Northern furnaces; similar irons have always been available from Northern furnaces. The only difference is that a fancy price prevailed and a fancy name was given these irons, when produced in the North. The Southern producer brought nothing new to the foundryman except unheard-of cheapness. And now that strength, fluidity, scrap-carrying quality, and a cheapness that has out-cheapened the Southern irons which they have bought in late years, are all to be had from Northern furnaces, a good many Northwestern foundrymen are going to them for all their wants.

It is claimed by some Northern foundry furnaces that a certain trade will take their iron in preference to Southern iron at the same price, because they have been able, with the chemist's aid, to duplicate orders more closely than their Southern competitors. It is true, however, that greater and greater regularity is being attained, by the same methods, at the furnaces of the South. It is one of the strongest proofs of the advance the foundryman has made, that he is less and less tied up to a mixture and more and more able to do what a time of unprecedentedly cheap castings compels him to do—to buy his iron from the furnace that will sell iron of the grade he wants, at the lowest price.

NIEDRINGHAUS tinplate plant at St. Louis started non-union.

HINTS ABOUT SMOKESTACKS.

It may be taken for granted that the average temperature of gases of combustion escaping from the common type of steam boiler ranges from 550° to 725° Fahr., and that when they fall below this the draught is apt to be poor and insufficient. While, when they rise much above the higher temperature that we have assumed, they tend to cause excessive draught that is useless with a corresponding waste of fuel, and, at the same time, heat the stack so that it is liable to crack, or, at least, crumble on the inside unless it is built of materials more refractory and better laid than usually obtain. Cheap stacks, built of ordinary bricks and mortar, are really unsuited for a temperature rising higher than 375°.

As for the height of stacks, it depends, to a great extent, upon local conditions, and this is especially true in American cities where sky-scraping buildings are rising one above the other. Under such circumstances a stack that, at a height of a hundred feet, would have an ample capacity for the work demanded of it, may have to be run up forty or fifty feet higher in order to avoid the down draught caused by a high building in the neighborhood. Good results can be obtained from a stack fifty feet high, and those ordinarily in use run from this up to 130 feet. I have the records of a stack 164 feet high that served to discharge the gases from three reverberatory furnaces and four foundry cupolas. We are apt to think that high stacks and all other big things are the products of this generation, but thirty-five or forty years ago a stack was erected in Manchester, England, that was 410 feet high, and even earlier there stood the celebrated one of the Galician salt mines that had a height of 738 feet. For a shop using four five-foot horizontal boilers, a stack 130 feet in height and an internal flue of four feet six inches in diameter will give good results, and give a margin for carrying off the gases of a brass foundry and allow something for growth.

If we calculate very closely on the resistance to the flow of gases, we find that a round stack is the best, but in practical working I have been unable to detect any difference between the round, square, or polygonal sections; and that style is usually adopted that coincides most closely with the taste and pocket-book of the builder. In estimating the sectional area of a stack, however, we should base it on the smallest portion, which is usually at the top, owing to the prevailing practice of building the stack conical or tapering in order to get strength to resist wind stresses.

The iron stack that must be used on locomotives and steam vessels is not altogether satisfactory for stationary work, especially where a soft, sulphurous coal is used. They are, however, extensively employed, especially for small boilers and in those places where the ground is of such a nature that brick stacks cannot well be erected, for the iron stacks may be made very much lighter than those of brick, thus resting securely on a lighter foundation. But they have a serious inherent defect, and it is that the outside air keeps them cool and thus lowers the temperature of the gases of combustion, which naturally has a deleterious effect upon the draught. Some claim, too, that they produce more smoke than brick stacks, but this statement would be exceedingly difficult to prove. I should never advise an iron stack for other than a temporary expedient, although I know of many that have been in constant use for years. But as a general rule they become in time very expensive in the matter of repairs.

One great trouble with iron stacks is to find a man to build them. There are no inspection laws, and they are subjected to no bursting strains, when in use, so that the matter of badly fitting rivets in holes that are out of line, or defective sheets, do not count, as they are not apt to be the cause of a disaster. But this very class of work is expensive in fuel, because the leakages may so affect the draught that the combustion will be poor, though it is impossible to detect anything out of the way in the boiler setting. As in a boiler, the metal used in an iron stack should be perfectly sound, free from flaws or cracks, sufficiently thick to withstand the strains put upon it, and then matched and rivetted together with as much care as that put upon the boiler itself. The metal may decrease in thickness from course to course, from the bottom to the top, in order to carry itself. It is customary to stay iron stacks with guy ropes, but if the stack is well designed and set this need not necessarily be done.

As far as the flow of gases is concerned, external ornamentation of the stack counts for nothing. The top may be merely an ending of a truncated cone, or it may be given all of the elegance that lies within the bounds of the bricklayer's art. There is a semi-commercial aspect to this finish that is worth considering. In the first place it is apt to give a protection to the top of the stack against deterioration that will count for something in the coming years, and then it is an advertisement. It pays to look prosperous; it is more easy for a well dressed man to do business than for one who is shabby; so a handsome stack towering above the buildings of a manufactory gives an air of prosperity that cannot fail to produce a more favorable impression than though it appears like a column left unfinished for want of more bricks to complete it. It is well to put a cast iron cap over the top course of bricks in order to prevent rain from filtering into the masonry and eventually crumble it away. On a sheet metal stack it is always well to rivet a strong ring securely about the top for strengthening and holding the stack in shape. Sectional caps should be avoided, as the parts are apt to get loose and fall. Copper caps have even been used in order to prolong the life, but such precautions can hardly be regarded as worth the extra expense. Finally when you are called upon to build a chimney, build a good one, and remember that the combination of good material and good workmanship will put up the cheapest stack.—[J. H. Allen in Dixie.

Wages Paid to German Iron Workers.

An interesting letter has been received by the Department of State from its commercial agent, George H. Murphy, in the grand duchy of Luxemburg, giving the rate of wages paid to iron and steel workers there. He says the average earnings of the ordinary workmen amount to less than $200 per annum, and women earn about half this amount. The following is the list of wages paid:

Steel works—Foreman, $60 to $70 a month; assistant foreman, $1.15 a day; first converter hands, $1.07 a day; second converter hands, 81c. a day; third converter hands, 73c. a day; first founders, $1.18 a day; second founders, 84c. a day; third founders, 76c. a day; first basin hands, $1.02 a day; second basin hands, 83c. a day; third basin hands, 75c. a day; fourth basin hands, 70c. a day; first converter machinist, $1.03 a day; second converter machinist, 82c. a day; three boys, 45c. a day; laborers, 84c. day; weighers, $18 a month; smiths, 70c. a day; masons, 90c. to 95c. a day; ingot cleaners, 52c. a day; boys, 20c. to 50c. a day; machinist, 65c. to 80c. a day; lubricators, 60c. a day; overseers, 75c. to $1 a day; cupola hands, 60c. a day; filters, 52c. a day; all other employes, 60c. to 80c. a day.

Rolling mills—Foreman, $50 a month; master rollers, $1.88 a day; first roller, $1.46 a day; second roller, $1.06 a day; assistant roller, 82c. a day; machinists, 35c. to $1 a day; lubricators, 40c. a day; laborers, 45c. to 53c. a day; overseers, $24 a month; all other employes, 35c. to $1.88.

Blast furnaces—Overseers, $20 to $25 a month; chief founders, $1 to $1.40 a day; first founders, $1; second founders, 76c. a day; third founders, 69c. a day; polisher, 69c. a day; crane hands, 55c. a day; machinists, 55c. to 75c. a day; masons, 65c. a day; laborers, 60c. a day; all other employes, 52c. to 70c. a day.

In a recent discussion of the question of substituting electric motors for shafting, this view was advanced: "Isn't it going to be cheaper to string a copper wire to a tool, have a small motor built with it, and drive by electricity than it is to turn a long line of shafting several hundred feet in length, and keep it revolving day in and day out, whether there is any work being done at the other end of it or no? Some large shops have answered 'Yes'; but the art is still in an experimental stage, and no one really knows. It seems reasonable, and I am rather disposed to believe it. But whether the electrical breakdowns of the motors will more than counterbalance the mechanical breakdowns of shafting and belts, remains to be seen."

THE Walker Mfg. Co., Cleveland, and their molders have settled their difficulties as to non-union workmen and as to the method of reckoning a day's work, and operations have been resumed.

NOTES ON THE RICHARDS DINNER.

CORRESPONDENCE OF THE IRON TRADE REVIEW:

NEW YORK, November 19.—As a representative body of men foremost in the theory and practice of metallurgy as it pertains to the manufacture of iron and steel, none holds a higher position than does the Iron and Steel Institute whose recent session was held at Brussels, Belgium. Composed of men eminent as engineers, managers, and owners of the largest iron and steel plants of Great Britain, France, Germany and the United States, its meetings, papers, and discussions, command not only the attention of the public generally, but of the best writers on subjects pertaining to iron and steel making as they embody the practice and experience of the most successful leaders in this line of industry. It was through the medium of the Iron and Steel Institute, that the famous discovery of Sir Henry Bessemer became known to the world, as was also the discovery in later years of what is now known as the basic process by Sidney Gilchrist Thomas.

It has been the practice of the Iron and Steel Institute from time to time, to award a medal known as the Bessemer gold medal to members prominent in engineering or metallurgy. About one year ago the Council of the Institute decided to confer this honor upon John Fritz, of Bethlehem, Pa., as their recognition of what he had accomplished as an engineer and manager of iron and steel works, and as a testimonial of their regard for him as a man. It was the intention of the President of the Institute, E. Windsor Richards, to come at once to the United States and make the presentation, but the illness and death of a member of his family, prevented for a time the carrying out of his plans. It was not until a short time ago that he was able to arrange his affairs to again make a visit to this country, a previous visit having been made in 1888.

The high professional standing of Mr. Richards, coupled with the fact that very many American engineers and others, during their visits to England, had received kindly and marked attentions from him induced them to take advantage of his presence in the United States to return in part at least, the courtesies received at his hands. To do this and to afford Mr. Richards an opportunity of making the long deferred presentation to Mr. Fritz, a dinner was given him at Sherry's on Fifth Avenue, New York, on the evening of the 9th. Some eighty persons, prominent as engineers, managers and owners of iron and steel plants in various parts of the country, were in attendance. Greatly to the satisfaction of those in charge of the affair, the Hon. Abram S. Hewitt returned from Europe just in time to preside, and while, as he humorously expressed it, he had not quite divested himself of his sea legs, and while he was by no means well otherwise, the happy manner in which he managed his own speech, and brought out the speeches of others, can best be imagined by those who know how heartily he enjoys such occasions and such surroundings.

The guest of the evening was warmly welcomed on behalf of the American Institute of Mining Engineers, of which he is a member, and on behalf of the American Society of Civil Engineers, the American Society of Mechanical Engineers, and the American Iron and Steel Association, by officers of these various societies. There was added a most cordial welcome on the part of the chairman, between whom and Mr. Richards a long and pleasant acquaintance has existed. It will always be a matter of regret to those privileged to enjoy such occasions, that the pleasure of listening to well-worded speeches, to flights of fancy, good natured bantering and the witty repartees that bring out the best that is in all, should be so ephemeral—that they should pass away, as the lights are turned down and the guests depart, into a silence that leaves no record, except that of memory behind.

To the toast "Our Guest," Mr. Richards made a most happy reply, in which he took occasion to speak of the marvelous changes he found had taken place since his last visit six years ago. These, as he was pleased to say, placed some of our industrial works ahead of anything to be found in the old world. He complimented the capitalists who had so liberally furnished the means to build these plants, and the engineers who had so boldly planned, and the workmen who had so well executed them; he paid a tribute to his friend of many years' standing and to whom it had been a long cherished plan of his to present in person the gift of the Institute over which he had the honor to preside. For this he had in part now come to the United States. In presenting the Bessemer gold medal, he desired as well to convey to the recipient as best he could, the love and good feeling so warmly felt for him by his friends beyond the sea, many of whom had entrusted to the speaker many messages of congratulation and kind regards.

The reply of Mr. Fritz on receiving the medal was one of characteristic modesty. He said he fully appreciated the honor conferred upon him by the Institute, an honor doubly esteemed from the fact that he received it at the hands of an old and valued friend. Replying to what Mr. Richards had said regarding the wonderful development of the iron and steel industry during the 25 years past, he said it was mostly the work of young men, some of whom had passed away, and all of whom had but slight opportunities of obtaining that thorough technical training so much to be desired but who possessed courage, perseverance and untiring energy to an extent that helped them to accomplish what they did. In receiving the medal, he did it in part in the name of the American engineers and iron workers with whom he had been associated, and to whom a good share of credit was due for what had been accomplished here. The speeches made by Andrew Carnegie, Oliver Williams, Thos. R. Morgan and others, were pertinent to the occasion, and enjoyed by all present. As the hour was growing late, and the time for the departure of the steamer which was to convey Mr. Richards to his home was approaching, good-byes were said with wishes of a safe and pleasant voyage. As the company passed out of the room they caught a glimpse of the two stalwart men who had been the centers of interest on this occasion, standing face to face, with all hands clasped together, exchanging congratulations on the successful issue of a long life in which there had been hard work, many failures and disappointments, now happily past, now wishing each other the best that lies in the future. It was a scene not soon to be forgotten, as it not only exemplified the warm personal friendship that had so long existed between the men, but it illustrated how even in these days of keen rivalry in business, and in the struggle for supremacy in trade, the influence of a common ancestry, of a common blood, and of a common desire to advance science and to bring about results of value to the whole world, was supreme above all else.

Growing Demand for Steel Sheets.

Mr. Chas. Knight buyer for the Excelsior Mfg. Co., at St. Louis, Mo., is thus quoted by *Stoves and Hardware Reporter* on the increasing use of steel sheets and the reasons therefor:

"Of the total output and use of sheet iron and sheet steel, at least 25 per cent is made from steel. I may add that steel is rapidly supplanting iron in even the lighter gauges, such as those used in stove pipes, and that this is brought about by the fact that the difference in cost is more than offset by the superior quality of the steel. A manufacturer of cold rolled smooth iron, and from whom we have bought largely, wrote me not long since that he would soon be making sheet steel and giving up the other product, and it is more than probable that his example will be followed by others. Steel is also used very generally in the place of common B iron, as it is in the heavier gauges of all grades. The change is certainly for the benefit of the jobbers and the consumers. It was difficult at first to use steel as a substitute because, first, of the higher cost, which was almost prohibitive for certain purposes, and, again, on account of the trouble and expense of making all the sheets of a uniform color. They had three distinct shades and this was against them, of course. Now, however, the cost has been reduced to a point very close to iron and the colors are invariably uniform, so that these objections have been successfully overcome. When iron alone was carried to the exclusion of steel, the jobber or retailer was obliged to handle larger stocks than is now the case, because these would include a supply of common, refined and extra-refined iron and each one of which would be very nearly equal to a stock of steel that can now be used for all ordinary purposes. It is probable, almost certain, that the cost of making steel will be reduced to a close parity with iron, so that it will almost entirely supplant it in time."

THERE is talk of arbitration at Niles, O., tinplate works.

LAKE SUPERIOR IRON MINES.

Ashland ore shipments for the season to the close of last week were 1,725,000 gross tons.

Some weeks will elapse before the new machinery will be in position at the Lake Superior mines at Hibbing, on the Mesabi. The mammoth duplex pump which is being put in has great capacity and is expected to handle easily the large volume of water encountered. Three of the ordinary No. 8 and 9 pumps are submerged.

The Columbia mine, Menominee range, has been hoisting 300 tons a day of late. The shipments of this mine for the season will be about 10,000 tons. The mine is in good condition and work will continue through the winter. The road for the permanent bailer has been completed as far as the second level.

At the two mines at Mountain Iron 320 men have been employed of late and shipments last week were at the rate of 3,000 tons a day. Stripping will be continued as long as weather will permit. Four shovels will be kept at stripping and the surface will be removed from the southwest side of the Rathbun, opening up the entire mine to the Lowmore property.

The Iron Belt and Atlantic mines, on the west end of the Gogebic range, are making preparations for active work. The Iron Belt and its neighbor, the Atlantic, are the best mines west of the Montreal. The Atlantic is a new property, but has an excellent body of high grade ore. Eighty men are now at work at the Atlantic, and stockpile building for next season is already under way. The Iron Belt has considerable ore in stock now, but is hoisting more. Section 12, adjoining the Belt on the west, is also a promising property, and will undoubtedly develop into something as big as the Atlantic.—[Ironwood, Mich., News-Record.

The Chapin's shipments for the season will be 230,000 tons, making a total since the opening of the mine in 1880, of 5,086,478 tons. In the report of Trustee Flannigan to the court in connection with the recent sale, the Trustee's compensation was put at $7,000; that of the solicitor on foreclosure, $3,000. The trustee says: "The property remaining unsold consists of surface rights in the northeast quarter of the southwest quarter of section thirty, township forty, north of range thirty west, and ninety dwelling houses thereon; an Iron Mountain city lot; about three thousand acres of land in Michigan and Wisconsin and an equity in the 1893 trustee ore. The real estate cannot be sold under the decree before October of next year. If the Chapin mine is in prosperous operation when the sale is made, the surface forty and the dwellings thereon, should bring a snug sum. The estimated worth of the acre property at forced sale is about twelve thousand dollars. It was purchased mainly for its timber, but some of it is said to have mineral possibilities."

The Champion mine has crushed and shipped 43,000 tons of ore this season.

It is expected that the Pewabic total will reach 325 000 tons Nov. 24, when shipping stops. Contracts have been let for the delivery of 2,000,000 feet of hemlock logs. The recently installed electric lighting plant is showing an economy in lighting.

At Duluth, after being out 36 hours the jury in the case of Leonidas Merritt against the Biwabik Mountain Iron Co., controlled by John D. Rockefeller, returned a verdict for $500. Mr. Merritt claimed $30,000 for services to the company. Judge Lewis ruled that a director or president of any corporation was in his relationship to his company a trustee, and that as such trustee he can recover for services rendered only by express contract ratified by the board of directors. After the ruling had been made, a case against the Mesabi Mountain Iron Company, which was to have been taken up at once was dismissed.

P. R. DILLON, who has been known as assistant secretary of the Carnegie Steel Co. for some time past, his specific work being the superintendence of the new Carnegie office building, is to be made general manager of the company, report has it, at the annual re-adjustment of the official list in January. Mr. Dillon, it is said, will thus be in control of the Homestead works as well as the Penn Avenue and Beaver Falls mills. Other important changes are looked for.

MR. CARNEGIE AT HOMESTEAD.

Andrew Carnegie and a party of friends spent Monday of this week in inspecting the Carnegie Steel Co.'s great plant at Homestead. Piloted by General Manager Schwab, the visitors entered the west or lower end of the works where they were shown the method of handling structural steel by means of electric machinery. Sufficient material is furnished here each week to erect two large steel buildings equal in size to the Carnegie building on Fifth avenue. After this they were shown a powerful saw for sawing cold steel. A 24-inch beam, weighing 100 pounds per foot, was cut in two in twelve seconds. The saw is a plain steel disk without teeth, and the surface travels six miles per minute. Leaving this saw, they passed through the largest mill in the world, where 20-inch beams were being rolled at a rapid rate. The armor finishing shop was next visited. Then the party went to the forging press, which, under normal conditions, can exert a pressure of 13 000 gross tons or 29,120,000 pounds. The machinery is so well regulated that the operator placed a walnut under it and cracked the shell without crushing the nut. It forged a 100-ton ingot into an armor plate 18 inches thick and 25 feet long. The plate weighed when finished 40 tons, and is intended for the battle ship Oregon. The tempering or hardening of armor plate by means of ice water was also shown. One-half million gallons of water are necessary to temper one plate.

Each of the guests was presented with a little programme of the day, on which it was stated that the Homestead Steel Works was one of the six rolling mills, and one of twelve works producing ore, coke, iron or steel, owned and operated by the Carnegie Steel Company. It occupies 235 acres of land. About 3,000 men and boys are employed, to whom is paid annually $2,400,000 in wages. The average capacity of the works is 600,000 tons of steel ingots. If one year's product were cast into a solid steel column five feet in diameter it would be 25 miles high.

The party was composed of ladies and gentlemen. Among the latter were H. C. Frick, J. G. A. Leishman, H. M. Curry, Geo. Lander, John W. Chalfant, B. F. Jones, C. E. Speer and A. H. Childs.

Scrambling for the New Plants.

An industrial revival is close at hand, not only a resumption of plants, which have been idle or only partially active during the past eighteen months, but a broadening of production, the starting of new shops and new factories. The need of these new sources of production will soon be felt. During the past eighteen months the population of the country has perceptibly increased; it has pushed a little farther into the recesses of the west. And under normal conditions the demand for all kinds of goods would be noticeably greater than during the earlier part of the year 1893.

It is one of the incidents of these times that the average city and village are keenly alive to the reawakening of industry and are putting forth unusual endeavors to secure some of these budding industries. Boards of trade are everywhere active in spying out the prospective manufacturer and the latter in many instances can dictate his own terms. The late depression has had an injurious effect upon the general public in so many unexpected and indirect ways that at the present moment everybody wants just as much industry humming away in their immediate vicinity as effort can secure. The encouragement thus offered so freely is one of the factors that must be taken into acco unt in making estimates upon the full recuperation of stricken manufacture.—[Industrial World.

MR. John M. Evans, who for the past two years has had charge of the sales of the structural material made by the Illinois Steel Co., at Chicago, has lately accepted the position of general manager of the Sharon Iron Co., of Sharon, Pa., and goes east to assume his new duties this week. Mr. Evans is well qualified for the position, having been it the iron business, both manufacturing and selling, for several years. He carries with him the best wishes of his associates in Chicago and of those who have had much to do with him in a business way.

MACHINE SHOP AND FOUNDRY.

DRILLING AND BORING MACHINES.

Two machines manufactured by Beaman & Smith, of Providence, R. I., are shown in the accompanying cuts. Fig. 1, represents a spindle drilling machine. It is intended for drilling or chucking holes through spindles for hollow spindle machines, though other long pieces can be drilled if less than 6¼ inches outside diameter and 30 inches or less in length. The drive cone is for 3 inch belt and of four sections, geared four to one of the spindle. The countershaft has two speeds, which gives eight spindle speeds from 27 to 114 revolutions per minute. The slide has over 36 inches movement by hand or power. The power feed, with automatic stop, is positively geared and gives $\frac{1}{100}$-inch movement to one revolution of the spindle. The thrust of drilling is taken against a ball thrust bearing of 63 ½-inch hardened and ground steel balls. This machine weighs complete 5,000 pounds.

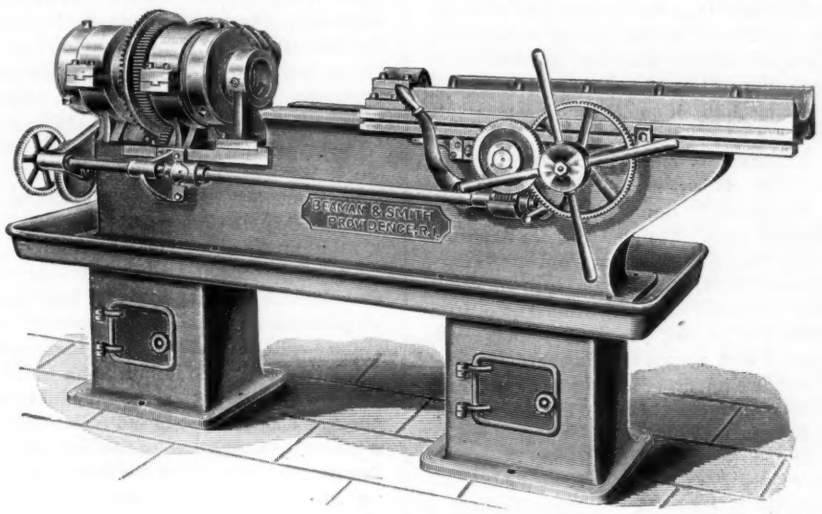

FIG. 1—SPINDLE DRILLING MACHINE.

Fig. 2 shows plainly the character of the adjustable four spindle drilling and boring machine of the Beaman & Smith make. It is used for drilling or boring from one to four holes at a time. The work is stationary and located in a suitable fixture placed on the platen. Each head has an independent hand or automatic feed with quick return. The spindles are adjustable from 5 inches to 18 inches between centers. Each has No. 4 Morse taper hole in the end and by an ingenious arrangement on the spindles, tools can be removed without stopping the machine. The bed is of sufficient length to take in 48 inches between the spindles. The platen is 20 inches wide and T-slotted, as shown. This machine weighs 11,000 pounds.

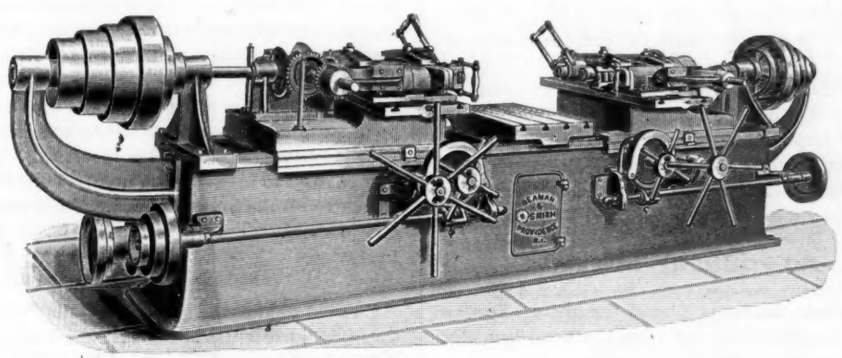

FIG. 2—ADJUSTABLE FOUR-SPINDLE DRILLING AND BORING MACHINE.

FOUNDRYMEN'S ASSOCIATION.

The annual meeting of the Foundrymen's Association was held at the Manufacturers' Club, Philadelphia, Wednesday evening Nov. 7. The election of officers resulted in the choice of those who served last year, with the exception of Mr. Thos. Devlin, who is succeeded by P. D. Wanner. In the executive committee, E. E. Brown succeeds H. C. Vansant, of Morris, Tasker & Co. Otherwise the committee is the same as last year. The list of officers elected is as follows:

President, Francis Schumann, of the Tacony Iron & Metal Co., Philadelphia; vice-president, P. D. Wanner, of the Mellert Foundry & Machine Co., Reading, Pa.; treasurer, Josiah Thompson, of J. Thompson & Co., Philadelphia; secretary, Howard Evans, of J. W. Paxson & Co., Philadelphia. Executive committee—Walter Wood, chairman, of R. D. Wood & Co., Philadelphia; Thomas Glover, of Glover Bros., Frankford, Philadelphia; E. E. Brown, of E. E. Brown & Co., Philadelphia; Stanley G. Flagg, Jr., of Stanley G. Flagg & Co., Philadelphia; Wm. F. Sauter, of G. Rebmann & Co., Philadelphia.

The address of President Schumann referred to the rapid development of iron production in the United States, and in the same connection discussed the outlook for the immediate future. The influence of a foundry association in assisting to better conditions in the foundry trade was also touched upon. President Schumann's figures for the increase of population in the United States in the various decades since 1850, showed that the average advance in each 10 years was 29 per cent. Between 1850 and 1890 the advance was 25 per cent. Production of corn and wheat increased 30 per cent. between 1880 and 1890; number of miles of railroad operated increased 80 per cent. in the same 10 years; production of coal increased 113 per cent.; pig iron produced increased 100 per cent., or from 4,144,254 long tons to 8,279,870 long tons. President Schumann thus comments on this showing:

"It appears that, while the population and production of wheat and corn have nearly kept pace, increasing at the rate of about 30 per cent., the increase in the production of coal and iron has been over three times as great, and railroads nearly so. We know that the uses for iron have been greatly enlarged in recent times; but not enough to account for the above excessive increase. Hence we are compelled to look forward to a decrease in the output to such a point that the increase will be more nearly equal to that of the population, because it is reasonable to assume that we will soon reach a

point when the use of iron will be at its maximum; after which the increase in its production must equal that of the population, unless we can create a foreign market, which at present seems far removed. We must prepare ourselves for a continued diminished volume of business. Although moderate revivals may be expected in the near future, they should not mislead us to believe that the old order of things had again come. The shrinkage in business coming upon many of us comparatively suddenly—although not unexpected—signs having been manifest during the last seven or eight years—tends to, and has already caused, serious and ruinous competition. Our profits, gauged by the capital invested and close application to business, are practically nothing. Each one is striving to obtain more than his proper allotment of work, under existing conditions, cutting prices continually, vainly waiting for a time of revival when he hopes to make good his losses, or consoling himself that he will be one of the survivors—considering himself one of the fittest—to tide over these trying times."

[A very pertinent statement is made by the *Iron Age* in connection with the above. It shows that a comparison of product alone is not fair, since it ignores imports. In 1880, these latter were unusually high. "In that year we imported 754,657 tons of pig iron, 112,456 tons of bar iron, 86,486 tons of iron rails, 66,304 tons of steel rails, 631,690 tons of scrap iron and 169,287 tons of tin plates. With additional quantities of plates, hoops, sheets and chains, the total tonnage was 1,849,034 tons, as compared with 250,593 tons in the fiscal year 1879. In addition thereto we imported $4,598,407 of steel ingots and billets in 1880, as compared with $1,281,942 in 1879. Here we have a demand not represented in the production statistics equal to about 2,000,000 tons of pig iron."—ED.]

Turning to the other branch of his address—the value of an association like theirs to the foundryman, President Schumann said: "I maintain that our association, when fully established, can be utilized to remedy the evil and aid us in at least obtaining a profit, however small, on the diminished amount of business remaining. Let us impress upon all foundrymen the importance of united action. Let us meet and counsel together, and let us solemnly agree to keep faith and abide by our joint action. Let us endeavor to include all foundrymen in the organization. Let us make it national and then meet in convention to devise ways and means for our welfare. All we strive for is but a fair compensation, which seems possible only through united effort. Let those of us who feel aggrieved, because the mere organization of our association did not at once bring about the hoped for improvement, but consider the difficulties. We must first bring into the association the great majority of foundrymen throughout the country before any results can be expected, and if fair men, they will do all in their power to increase our prestige rather than find fault. We have all reason to be gratified with the present condition of our association."

Reports from foundrymen, chiefly in the East, as read by Secretary Evans, showed that the volume of business is unsatisfactory and that improvement seems delayed. After the meeting the members partook of a collation in the cafe of the club—a feature of their gathering, which the Eastern foundrymen have cultivated with good results.

SHOP AND FOUNDRY NOTES.

The nearer the cupola the fan is placed the more effective it will be. A small fan placed six feet from the wind-box will do the work of a much larger one 100 feet away.

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One of the notable features of Edison's iron campaign is his saving of the by-products of his crushing and concentration of the lean magnetic ores in the New Jersey hills he has bought up. Every pound of material that comes from his crushers is utilized, and foundrymen have an interest in these operations from the fact that good core sands and facing sands are among the possibilities. It has already been demonstrated that the residual sands of concentration, as carried on at Ogden, N. J., are well adapted to three important mechanical uses and experiments are being conducted to determine still further adaptations. Advices to *The Iron Trade Review* from Mr. Edison some time ago expressed his confidence in the entire success of his iron ore campaign. It need not be pointed out that the outlook for commercial success with briquetted concentrates has been greatly improved by the chances of marketing the sand products at a profit.

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From time to time I have had a word to say about the economy of using traveling cranes and similar contrivances for helping the helper. The traveling crane cannot cover the whole shop, and in many places would be useless, but there is a handy appliance in the shape of a pneumatic lift that comes in right handy for lathe and individual tools. Yes, I know you have a self-sustaining chain hoist, but it requires some muscle and considerable time to operate it. A pneumatic lift, working by compressed air, is, by all odds, the handiest, cleanest, quickest method of lifting weights from the floor to the lathe centers or planer bed that I have yet seen. If you have a spare spot in any of your shafting, just put on a split pulley and drive an air compressor, a line of pipe running to your tools completes your outfit, and the time saved will pay for the outlay before you know it. If you want to learn what people think of it, ask some railroad master mechanics, for they are stampeding into a multitude of uses of compressed air.—[J. H. Allen.

***

The magic by which wine and water are drawn from one flask, says *Dixie*, is child's play beside magic used by the job shop moulder who is asked to make a stove plate, a fine close-grained cylinder and a fire arch in the same heat. He ought not to be asked to do it, but, as he is, he should have credit for a skill that is not easily found. It means that he must know all about the irons and fuel that he is using; that he must have a cupola tender that will obey implicitly the orders that are given him; that the floor must be ready for the pouring when the proper iron comes down, and that he must be able to estimate very closely as to the weight required for each mould to be poured. Then comes the judgment that decides how the different pourings shall succeed each other with the least possible amount of harm when the iron from one tails over into the next. When we consider that this must usually be done with a poorly lined cupola, with a charging floor out of reach, and an engine that may or may not run the blower up to speed, I am inclined to take off my hat to the job shop foreman as being a magician of the first water.

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To ascertain the strength of a round cast iron column it is only necessary to know the number of square inches of area in its cross section (no matter whether solid or hollow) the diameter (smallest, always, if column is tapered) and the length; then use a set of constants, 40 for cast iron and the constant 400 for round, and 500 for square columns. The first step is to find the ratio between length and smallest diameter. To do this, get both in inches and divide one by the other. Multiply this ratio by itself, divide by the constant 40 and add one. Multiply the square inches of sectional area by the constant 40 and divide the product by the sum to which one was added, as noted above. The result will be the load that is just enough to break the column. The safe load is one-fourth to one-tenth the breaking load. The former for columns subject to shocks or vibrations; the latter for dead, or steady loads.

***

I was in a shop the other day that was "pretty but badly dressed," in that the upper part was disfigured by the shafting and its supports. It was especially noticeable in this instance, because the roof was light, airy, and of an exceedingly graceful design. One side of the shop was clear and used for the repairing of locomotives that had been run in over the pits; there was no shafting overhead, and that portion of the shop had a singularly clean and picked-up appearance. The opposite side was occupied by the machine tools, and overhead there was a network of girders, shafting and braces, with belting running in every direction. It was a notable example of what might have been accomplished had electric motors been used for driving the individual tools. No one could look on this picture and then on that without being thoroughly convinced of the desirability of using this new method for the transmission of power for machine shop purposes.—[J. H Allen, in Dixie.

STEEL AND CAST IRON IN BUILDINGS.

The durability of the steel beams used in the construction of the tall buildings of the cities is a question upon which there is as yet no great amount of testimony. Time enough has not yet elapsed since their general employment in this capacity for any untoward developments, yet there was a difference of opinion on this point in the discussion on the subject at the recent annual convention of the American Institute of Architects. It is to be considered, in connection with the opinions expressed, as reproduced below, that they are not those of metallurgists. Where results of actual experience are given, the statements are, of course, to be regarded as authorative.

The discussion was opened by Geo. B. Post, who said that he had very radical views on the subject of high buildings. He believed that the life of steel structures would be short, far shorter than supposed, owing to the deterioration of the beams from rust. He had taken beams out of the old Times building that had been there for 35 years that were rotten from rust. These had been over the old boilers, but were buried in eight inches of brickwork. He did not think that paint and asphaltum were a sure protection. All plate beams were laminated, and the rust splitting off the laminations, a fresh surface was constantly exposed. He admitted that steel rusted less than wrought iron, but more than cast iron. In putting up buildings of the cage construction he always built the cage inside (the walls being anchored to it), so that it could be readily inspected.

W. L. B. Jenney believed that wrought iron was as durable as cast iron, and thought that steel was equally lasting. In Chicago the difficulty was, not to protect against fire—that they could do—but against the firemen. He cited the case of the Athletic Club fire, where the terra cotta walls were almost at a white heat when the streams of water were applied. He had found that wire lath covered with any good wall cement stood fire and water tests admirably. For external fire protection he thought porous terra cotta very good, providing the anchors were well covered. For internal protection of warehouses, where inflammable goods were stored, he suggested putting on a second lining of fire proofing.

C. H. Blackall suggested a plan for protecting externally by the use of a water curtain flowing over the walls.

Mr. Robinson thought the design of high buildings was more of a utilitarian problem than an artistic one. He objected to cast iron, as engineers had found it impossible to devise any satisfactory scheme for inspecting it.

Mr. Post then said he was able to get satisfactory cast iron columns and satisfactory tests. He believed in using it in part, together with steel. He did not think that the question of elevating space was a serious one now, since the electric elevators were coming into use, and a large saving of space for machinery was effected by their use, as they took not more than one-third the space taken by hydraulic elevators.

Mr. Jenney again spoke strongly in favor of steel, and spoke of defects discovered in iron castings in his experience that would not have been developed by any of the usual tests.

Prof. W. H. Burr said that he believed in looking at the question fron the standpoint of an engineer. Engineers had had so much trouble to get reliable cast iron work that now they used it as little as possible. He cited his experience where apparently reliable castings had given way and sometimes exploded before any load had been applied, owing to the internal strains. Cast iron was always right for pedestal blocks and where used in heavy masses. He was surprised that architects were so willing to use it. While the general impression was that cast iron resists corrosion better than wrought iron, he thought that there was really little difference. Under adverse conditions there was no doubt that wrought iron and steel often corrode very rapidly, but when properly painted and under ordinary conditions this never occurred. He had never seen laminations split off. Structural steel was not laminar.

President Burnham then gave his experience, quoting a number of cases that had come under his notice, and affirmed his belief that steel was perfectly reliable. He described the conditions existing in Chicago, and how they came to use steel footings there. The only danger, he thought, lay in the jotsts and at the faces of the beams.

In concluding the discussion, Mr. Post said that he did not criticise steel so much as he did much of the construction now going on in New York, where the work was put up with apparent recklessness in many cases. He had seen the rain from a northeast gale driven through a brick wall four feet thick and run down on the inside of the building. Beams exposed to such moisture would certainly rust very fast. He feared more for rear walls than front walls, as the former were never as well protected.

The Finding of the Pullman Commission.

The report of the United States Strike Commission on the Pullman strike is not merely a disappointment; it is a somewhat dangerous document. The country had a right to hope that the Commissioners would make a report which would have weight both with employers and with the employed, to the advantage of both, and to the good of the whole country; but whatever influence for good this report might have had is nullified by its obvious bias and its one-sided reasoning. We not only admit that labor unions must be recognized as existing and as having a right to exist, but we are pretty sure that they are a necessary part of that phase of social evolution in which we now are. This we have often said, in various ways, and few employers of intelligence deny it. But the liberty of the individual is the very foundation of our whole civilization; it is precisely what government exists for; and the trades unions are to-day the most terrible engine of oppression to be found in the United States of America. This fact the Commissioners do not touch upon at all, or if they do, they touch it so lightly that their words leave no impression on the mind. On the other hand the General Managers' Association, which at the time of the strike prevented the collapse of a great part of the railroad system of the country, and which for the last three or four years has been the means of making it possible to carry on those industries which depend upon the steady working of all railroads centering at Chicago, is treated as a dangerous, extra-legal organization with no right to exist; in fact, a menace to society.

Further, if there is any lesson that the workingmen of the United States need to learn it is that of their reciprocal obligations toward employers; it is that no prosperity for them or anybody else can be built up and endure unless it rests upon honor and sobriety in conduct. Of all this there is not a word in the report; and, finally, it closes with an illogical scheme of compulsory arbitration which breaks down under scrutiny. Of course, the report will be a comfort to vast numbers of shallow people who think that they are full of sympathy for the human race, and of designing men who like to keep workingmen in a ferment for their own purposes; and doubtless it will do some harm in encouraging those classes. Possibly it may do a little good in leading employers to think on the workingmen's side; and in leading workingmen to think on the employers' side; but we should suppose that the good will be far less than the evil.—[Railroad Gazette.

An English firm, Ellwell-Parker Co., has organized the Ellwell-Parker Electric Co. of America, and having interested the Brown Hoisting & Conveying Co. and other Cleveland capital will begin at once the manufacture of heavy electrical machinery in well equipped shops. The company will make a specialty of low period direct-connected and bolted alternating current dynamos; also the equipment of elevated roads by their elevated system. They will also make a specialty of direct current generators. J. Holt Gates, 1140 Manadnock Block, Chicago, will represent the company in the West.

The City Council of Bessemer, Ala., closed a contract with the Bessemer Land & Improvement Co., by which the city buys the water works from the company for $125,000, and the company agrees to expend that amount and $200,000 more in the erection of a steel plant. The company's officers say that work on the steel plant will begin at once.

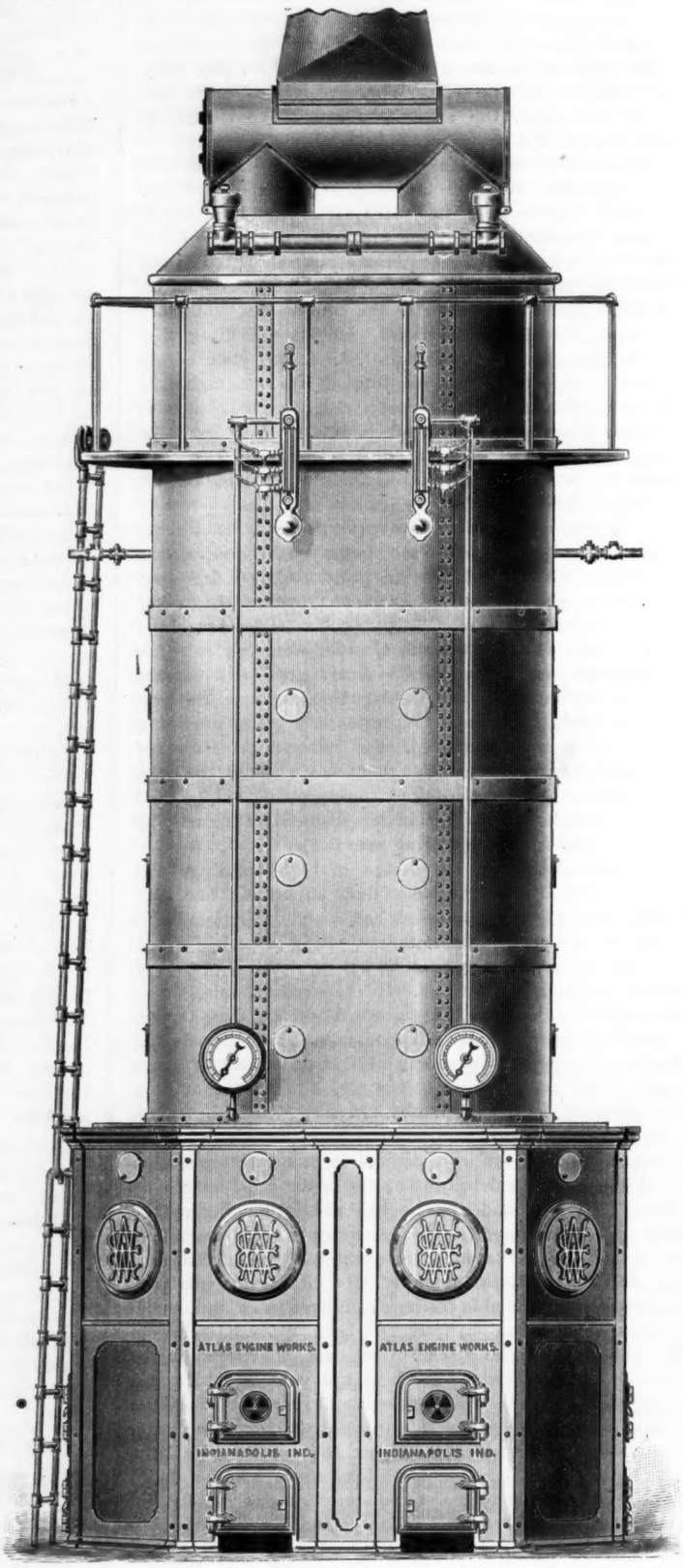
The crane just completed for the arsenal at West Troy, N. Y., by the Shaw Electric Crane Co., through their agents, Manning, Maxwell & Moore, 111 Liberty street, New York, has a capacity of 100 tons, 60 foot span and has a lift of 50 feet. It weighs 80 tons and required six cars to transport it.

NEW VERTICAL WATER TUBE BOILER.

The accompanying illustrations give front and sectional views of a new vertical, high-pressure water tube safety boiler, designed and manufactured by the Atlas Engine Works, of Indianapolis, Ind. The boiler is mounted in an upright position within an enclosing casing lined with fire brick. The lower part is a peculiarly shaped drum of an inverted bottle form, a central portion of less diameter extending down below the grate, while the main portion is held at a considerable height above the fire. The contracted portion of the lower drum is encased by fire brick. The mid-height of the boiler is a set of vertical tubes. The upper part is a drum in which a liberal surface is presented for the disengagement of the steam from the water. The descent of the water through the central tubes is promoted by a set of telescoping tubes extending the water tubes to near the bottom of the water leg, which may be slipped up into the water tubes out of the way whenever necessary to enter the water leg for cleaning or repairs.

When extended downward so as to be fully efficient, these tubes protect the central set of tubes from being affected by the large volume of steam generated in the exterior portion of the lower drum. The steam generated there rises through the series of tubes above, and insures an active upward current of steam and water through those tubes, and further steam is generated in these tubes by the circulation of the gaseous products of combustion through the spaces between them. The steam and water thus rising separate in the upper drum and the steam is conveyed away for use. The water descends through the central tubes of the series, which tubes are over the central portion of the bottom. The small quantity of steam generated in these central tubes is carried down by the descending current and, moving outward in the lower portion, rises and contributes to the vigor of the strong rising columns in the tubes near the periphery of the series.

The non-conducting protection between the central portion of the boiler and the annular furnace which surrounds it protects the fire from being too much cooled along the inner edge and allows all portions of the grate surfaces to be about equally efficient. The fire brick also preserves that portion of the boiler from being overheated in any exigency. The annular grate is slightly inclined inward. The annular furnace is fed, cleaned, etc., through doors in the outer casing. A perforated protection of fire brick is extended over the fire at a proper height. At the mid-height of the tubes the masonry wall is extended inward so that it comes nearly or quite in contact with the outermost tubes. The hot gaseous products of combustion deflected inward thereby are caused to circulate among the tubes. They are afterwards led outward and upward around the exterior of the upper drum and finally collected and conveyed away through a central stack at the top. The makers will be glad to furnish further details.



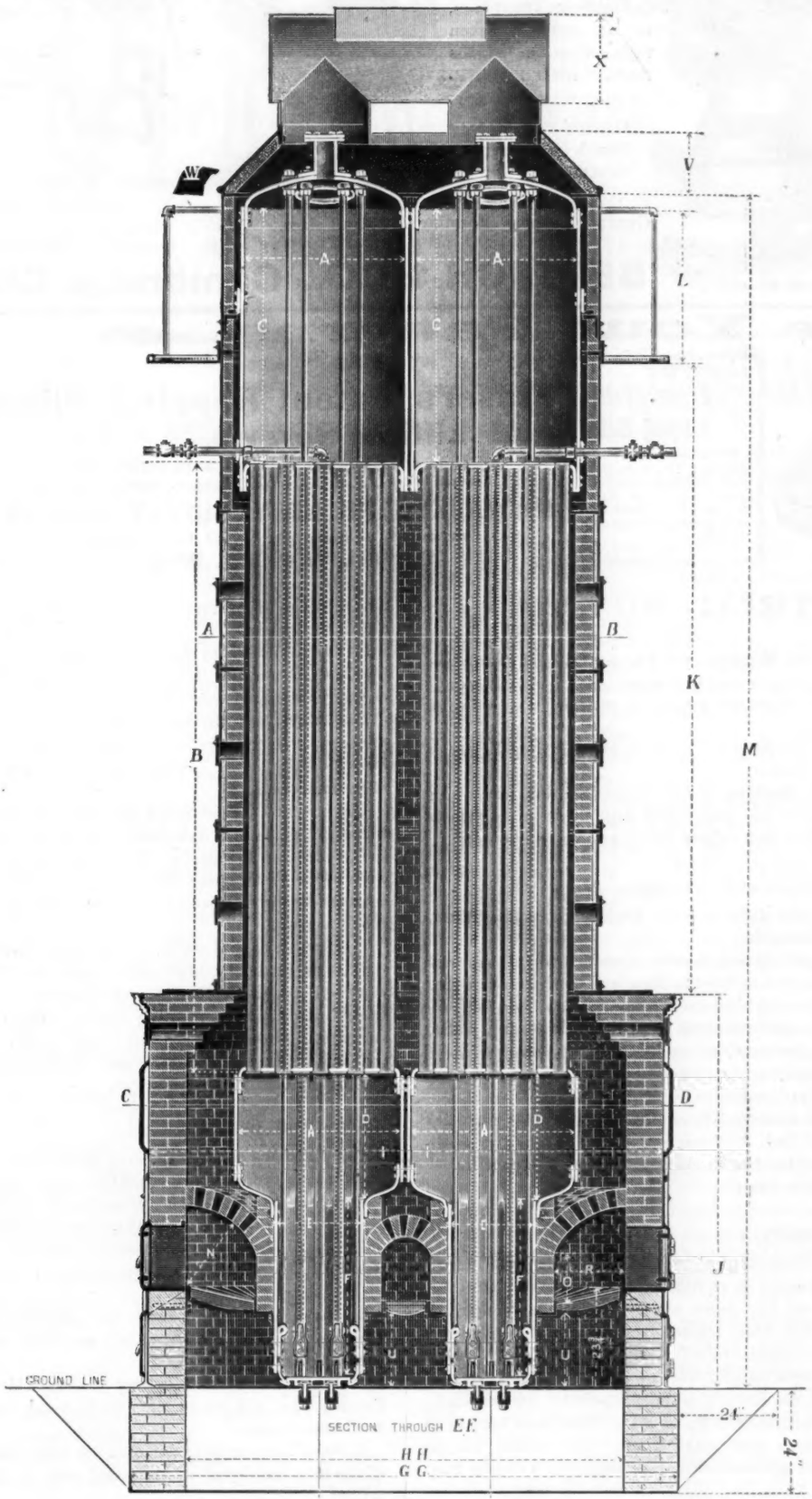
NEW VERTICAL WATER TUBE BOILER.

That Japanese Contract for Alabama Pipe.

A good deal has been said in market reports elsewhere about the big contract for pipe taken in Japan by the Howard-Harrison Iron Co., of Bessemer, Ala. A Tacoma, Wash., dispatch announced the return from Japan of W. G. Norris who secured the contract for $370,000 worth of pipe. The Howard-Harrison Iron Co. telegraph the Baltimore *Manufacturers' Record* as follows: "We were the lowest bidders, through our agent, W. G. Norris, in competition with the world on 10,000 tons at Tokio some time ago, but declined contract on account of prospects of war and deliveries required; therefore, don't think newspaper report correct." The *Record* adds: "This contract, whether it be carried out or not, simply emphasizes the value that the Nicaragua Canal would be to the South. If Alabama iron can compete with the world in Japan, even after paying rail freight across the continent, how much stronger would be its position with the canal completed."

NO ONE using leather belts can afford to be indifferent to their care. There is a certain amount of elasticity in all good leather belting, but time and continued hard work seem to destroy or at least weaken its power. Then comes the ques-

tion whether it is better to simply tighten the belt or use some form of dressing. Experience of many very practical observers seems to favor the use of a good dressing, as tightening the belt strains it and calls for more engine power. A dynamo engineer who is transmitting 60-65 h. p. with a 50-foot link belt 8 inches wide, running from a 72-inch pulley on driving shaft to a 13-inch pulley on dynamo, claims that freedom from jumping and flickering of the lights is due entirely to the belt dressing used and that tightening never helped. The superintendent of a large printing establishment has an 18-inch main belt now running its eighth year which has never been taken up, and it would be extremely hard to convince him that the dressing used does not preserve the life of the leather and keep it soft and elastic. Of course one should be careful what sort of dressing is used. Soap, rosin, tar and tallow should not be used at all. Even castor oil is criticized. The dressing used in the two cases cited was Dixon's belt dressing and leather preservative, which was the only article that would start the big driving belt used at the Paris Exposition in 1878, and keep it from slipping. Circulars about the dressing will be sent by the Dixon Crucible Co., Jersey City, N. J.



NEW VERTICAL WATER TUBE BOILER.—See Page 14.

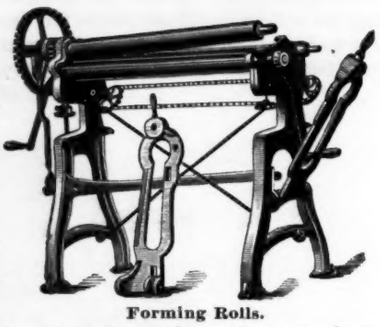
MACHINES FOR WORKING SHEET METAL

Patent Gap Shears.

Patent Gap Shears, Especially designed for Squaring, Trimming and Slitting. 6 to 18 inch throat for Slitting Wide Sheets. Complete for Tin or Iron, to 14 gauge. Seven Styles of various lengths HAND AND POWER.

General Purpose Punch and Shear. Seven Sizes.

Rear Side.



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INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review* and we will put you in communication with our advertisers at once.]

The Virginia Soapstone Co., Schuyler, Va., will buy a second-hand iron planer.

The Enterprise Machine Works, Richmond, Va., wants a 24 or 25 inch back-gear and power-feed drill press, 16 or 17-inch shaper and 10-foot 8-inch engine lathe, new or second-hand.

Additions, Enlargements, Removals, Etc.:—

Extensions of the Illinois Steel Co.'s plant at Bay View, Wis., are being planned.

An additional rolling mill for the manufacture of grooved skelp iron will be put up by the Reading Iron Co., on a site adjoining the Keystone blast furnaces.

The New England Electrolytic Copper Co., at Central Falls, R. I., have just completed an addition to their works. It is entirely of iron and steel furnished by the Berlin Iron Bridge Co., of East Berlin, Conn.

The Chicago & Eastern Illinois Railroad will remove its shops from Brazil, Ind., to Momence, Ill. The work of loading the machinery has already begun. The company will still leave small shops at Brazil.

Fires and Accidents:—

Fire in the machine shop of the Central Tennessee College caused a loss of $20,000 on equipment and $4,000 on building.

The store house and paint shop of the Wells-French Car Co., at Ashland and Blue Island avenues, Chicago, together with the contents, consisting of street cars in various stages of construction, were burned Nov. 15, with a loss of $16,000.

At Ironton, O., the Russell foundry, operated by the Gladiator Stove Co., burned with $5,000 loss. Seventeen men were employed. It was a good small plant. The cupola was relined recently and arrangements were made for a steady run.

New Construction:—

The new Louisville, New Albany & Chicago shops at Lafayette, Ind., are going up rapidly.

Repair shops will be built near Warren, O., by the B. & O., at the junction of the Pittsburg & Western and Lake division.

It is probable that the plan to build new Cleveland, Cincinnati, Chicago & St. Louis shops at Indianapolis will be carried out in the spring.

It is announced that the shops of the Michigan Division of the C., C., C. & St. L., are to be located at Wabash, Ind. The city gives the road the necessary ground and $50,000.

The Edge Moor Bridge Works, at Wilmington, Del., have the contract at $50,000 for the new shops of the Atlantic & Danville Railroad at Lawrenceville, Va. The shops are now at Portsmouth.

The new machine shop for the American Hard Fibre Co., at Newark, Del., is now completed. It is designed and built by the Berlin Iron Bridge Co., of East Berlin, Conn., and is 50 ft. wide by 226 ft. long, the roof being made of steel and covered with the Berlin company's anti-condensation corrugated iron roof covering.

The $75,000 capital stock of the new sheet mill at Hyde Park, near Pittsburg, is all subscribed and the construction work will be pushed. The main structure will be built of iron, 113x175 feet; annealing house, 50x100 feet; wareroom and packing house, 50x100 feet; boiler house, 65x75 feet. The mill will be fired with natural gas, and its product will include black plates, sheet steel and iron.

General Industrial Notes:—

The Pittsburg Wire Co's. plant at Braddock, Pa., has started up again on orders that mean a five weeks' run.

Furnaces 3 and 4 at the Pennsylvania Steel Co.'s works at Steelton, Pa., together made 12,000 tons of iron in October.

The H. P. Deuscher Co., Hamilton, O., has bought out the Excelsior Foundry Co., of Cincinnati, and removed the outfit to Hamilton.

Business is increasing with the Hendey Machine Co., of Torrington, Conn. Export trade has been better than usual the past year.

It is reported that the Pioneer Mining & Manufacturing Co., Thomas, Ala., will put in blast its furnaces and several hundred coke ovens.

A cut of from 10 to 15 per cent has been made in the wages of the men employed in the steel end of the Shoenberger mill at Pittsburg.

The Northwestern Steam Boiler Works are building a plant at Duluth, Minn., for the manufacture of stationary, marine and locomotive boilers.

The South Mills of the Lackawanna Steel and Iron Co., Scranton, Pa., started recently on orders for 6,000 tons of rails which will be rolled in two weeks.

MOUNT SAVAGE FIRE BRICK.

UNION MINING CO.,

Proprietors of the CELEBRATED Mount Savage Fire Brick.

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Ground Clay in Bulk or Sacks. Send for list of shapes.

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CLEVELAND, OHIO.

A machine for straightening angle iron is a part of the outfit recently ordered from the Lloyd-Booth Co., of Youngstown, O., by the East Chicago Iron & Steel Co.

Among the new foundries equipped with cupola, ladles, etc., by the Whiting Foundry Equipment Co., of Chicago, is that of the C. T. Segar Mfg. Co., Chicago.

The Bickford Drill & Tool Co., of Cincinnati, have shipped one of their largest radial drills to England. They have on their books orders for four to go to South Africa.

At Akron, O., the foundry of Aultman, Miller & Co.'s has started up and a full force will soon be put on in other departments. The Empire Mower & Reaper Co. expects to start up soon.

The W. A. Jones Foundry Co., Chicago, note an increase in their orders for pulley sheaves, hangers, etc., several contracts that had been hanging fire having been closed since the election.

The Lima Locomotive & Machine Co., Lima, O., which purchased the plant of the Lima Steel Casting Co., has put it in operation. It is equipped with a 10-ton open hearth furnace.

The railroads at New Castle, Pa., handle 1,616,000 tons of freight annually, including ore, coke, limestone, steel billets, pig iron, wire rods, coal, tin plate, sheet and tin plate, bar and skelp iron.

C. Seymour Dutton, of Youngstown, O., will engage in the manufacture of cold polished shafting, having organized a company at that place. The patents are owned by C. S. Dutton and P. M. Hass.

The Western Society of Engineers, Chicago, on last Saturday visited the industries of South Chicago, including the plants of the Illinois Steel Co., Iroquois Furnace Co., and Chicago Shipbuilding Co.

The largest number of orders taken in any one month in a year, was booked by the Illinois Screw Co., of Chicago, in October. Arrangements are being made to move the factory to Chicago Heights next Spring.

The Weimer Machine Works Co., of Lebanon, Pa., have booked orders for their liquid cinder cars from the Illinois Steel Co., the Poughkeepsie (N. Y.) Iron Co. and the Sloss Iron & Steel Co., Birmingham, Ala.

The iron works at Brilliant, O., long inactive, have been sold it is reported. Iron and steel pipe and tubing will be the principal output. J. R. Jackson, of McKeesport, Pa., is said to be chiefly interested in the new enterprise.

Joseph H. Cofrode, Francis F. Saylor, Charles A. Sterling, George W. Bush, Edward J. Kelly, Ellis Ames Bollard and L. P. Evans were elected directors at the annual meeting of the Reading Rolling Mill Co., in Philadelphia.

The Mexican Central Railroad will contract for 300 box cars. The Peoria, Decatur & Evansville road asks bids on 200 box cars. The Bloomsburg (Pa.) Car Works have a Cuban contract for 100 steel cars, eight tons capacity, to be used in transporting sugar cane.

It is reported that furnace No. 1, of the Tennessee Coal, Iron & Railway Co., Bessemer, Ala., will be put in blast as soon as a stock of ore can be obtained. The other four furnaces are now in blast, and when No. 1 starts up it will leave only one or two idle industries in Bessemer.

Messrs. Pardee & Young, coal dealers of Fall River, Mass., have recently obtained permission from the harbor commissioners to extend their coal wharves, and are erecting machinery to handle their coal. They will use the C. W. Hunt Co. elevator and two automatic railways.

The Quincy Mining Co., of Hancock, Mich., extensive mine operators, have just placed an order with the Lodge & Davis Machine Tool Co., of Cincinnati, O., for an outfit of tools, including several large lathes, two full universal radial drills, etc., to be used in repairing and manufacturing mining machinery.

An Elwood, Ind., dispatch says that the Elwood Iron Works have assigned and that the Radiator works at the same place has been sold to Chicago and Indianapolis people. The two concerns were identified and made a specialty of heavy castings, tin-plate machinery and Holland radiators. A large business was done but dissatisfaction arose among stockholders.

H. E. Collins & Co., sales agents for the Cahall vertical water tube boiler manufactured by the Aultman & Taylor Machinery Co., of Mansfield, O., have sold 400 horse power boilers to utilize gases from the blast furnaces of the Sharon (Pa.) Iron Co., and 300 horse power waste heat boilers to Zug & Co., of Pittsburg.

The Howard-Harrison Pipe works, Bessemer, Ala., procures iron at $6 a ton, so it is stated, and can afford to sell pipe at $15 a ton. No other pipe works in the world can afford to sell for less than $18 a ton. Hence the Howard-Harrison Pipe works can easily sell as much as it can make. When the enlargement now in progress is completed, it will be the largest pipe works in America.—[Chattanooga Tradesman.

Newark, O., feels sure of a four-mill tin plate plant. A party of Pittsburg capitalists offered to purchase a piece of

land in the east end of the city and erect the plant thereon, provided citizens would subscribe for 400 lots at an average valuation of $250 per lot. They then lowered the number to 325 lots, and at a mass meeting enough were taken to assure the building of the plant within the next ten months. The proposed plant will employ about 300 men.

The Crane & Breed Mfg. Co., of Cincinnati, O., for some months of this year worked their men only half time, and for six weeks in the dullest part of the season, they were shut down entirely. As business has been improving within the last two months they have increased their force and now have 350 men in all departments on full time. Their full complement is 400 men. They are having increasing inquiries and orders, particularly for the products of their foundry department.

The manufacturers in the Cincinnati district report a more hopeful outlook. The Mitchell-Tranter Co.'s bar, plate and sheet plant has been running with full force since September 1st, and there is a possibility of an increase in the number. The Cincinnati Rolling Mill Co. at Riverside is running double turn with 275 men employed. At the Newport Rolling Mills, 250 men are employed and there is special activity in sheet iron. Orders have been booked for several weeks ahead.

Thanksgiving Excursion.

One fare for the round trip between all stations on the Valley Railway. Tickets on sale Nov. 28th and 29th, good returning to and including Nov. 30th, 1894.

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Visit picturesque Mackinac Island. It will only cost you about $12.50 from Detroit; $15 from Toledo; $18 from Cleveland, for the round trip, including meals and berths. Avoid the heat and dust by traveling on the D. & C. floating palaces. The attractions of a trip to the Mackinac region are unsurpassed. The island itself is a grand romantic spot, its climate most invigorating. Two new steel passenger steamers have just been built for the upper lake route, costing $300,000 each. They are equipped with every modern convenience, annunciators, bath-rooms, etc., illuminated throughout by electricity, and are guaranteed to be the grandest, largest and safest steamers on fresh water. These steamers favorably compare with the great ocean liners in construction and speed. Four trips per week between Toledo, Detroit, Alpena, Mackinac, St. Ignace, Petoskey, Chicago, "Soo," Marquette and Duluth. Daily between Cleveland and Detroit. Daily between Cleveland and Put-in-Bay. The cabins, parlors and staterooms of these steamers are designed for the complete entertainment of humanity under home conditions; the palatial equipment, the luxury of the appointments, makes traveling on these steamers thoroughly enjoyable. Send for illustrated descriptive pamphlet. Address A. A. SCHANTZ, G. P. & T. A., D. & C. Detroit, Mich.

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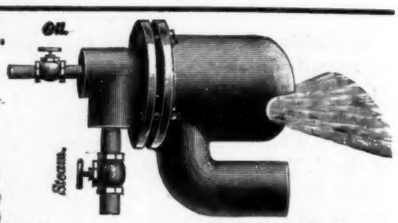

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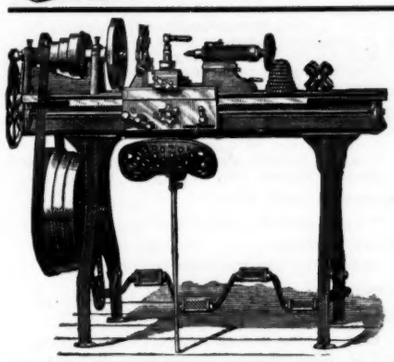

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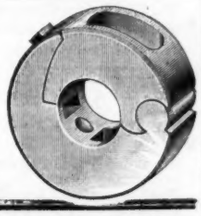

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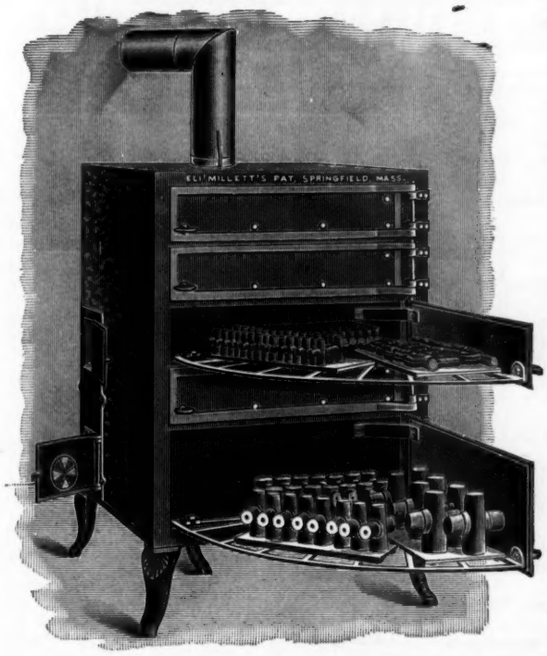

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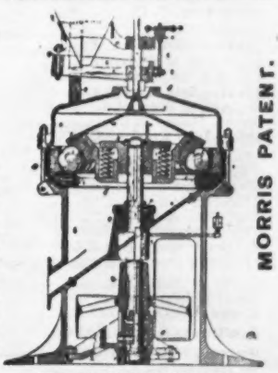
CLEVELAND IRON ORE PAINT CO.



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No. 2 Strong Foundry	10 25@ 10 65
No. 1 Gray Forge, red short	9 50@ 9 75
No. 2 Gray Forge, neutral	9 25@ 00 00
No. 1 American Scotch	11 65@ 00 00
No. 2 American Scotch	10 65@ 00 00
Lake Superior Charcoal	13 00@ 13 50

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No. 1 Foundry	$11 25@$11 75
No. 2 Foundry	10 25@ 10 75
Gray Forge	9 50@ 9 75
White and Mottled	9 00@ 9 25
Warm Blast Charcoal	18 00@ 19 00
Cold Blast Charcoal	22 00@ 26 00
Bessemer	10 65@ 00 00

CHICAGO (reported by our representative:)

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Local Coke Foundry No. 1	10 25@ 10 50
Local Coke Foundry No. 2	10 00@ 10 25
Local Coke Foundry No. 3	9 50@ 10 00
Local Scotch Foundry No. 1	10 75@ 11 00
Local Scotch Foundry No. 2	10 00@ 10 50
Local Scotch Foundry No. 3	9 50@ 10 00
Southern Coke No. 1	11 00@ 11 25
Southern Coke No. 2	10 25@ 10 50
Southern Coke No. 3	10 00@ 10 25
Southern No. 1 Soft	10 25@ 10 50
Southern No. 2 Soft	10 00@ 10 25
Southern Silveries No. 1	11 50@ 11 75
Southern Silveries No. 2	11 25@ 11 50
Jackson Co. Silveries	15 00@ 16 00
Ohio Silveries No. 1	14 00@ 14 50
Ohio Silveries No. 2	13 00@ 13 50
Ohio Strong Softeners	13 00@ 13 50
Alabama Car Wheel	17 50@ 18 00
Malleable Bessemer	10 50@ 11 25
Coke Bessemer	11 25@ 11 50

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Southern Coke No. 2 and No. 1 Soft	9 50@ 9 75
Hanging Rock Coke, No 1	12 00@ 12 50
Hanging Rock Charcoal No. 1, Fdy	16 00@ 17 00
Tennessee Charcoal No 1	14 00@ 14 50
Jackson County Stone Coal No 1	14 50@ 15 00
Southern Coke, Grey Forge	8 50@ 8 75
" " Mottled	8 25@ 8 50
Standard Alabama Car Wheel	15 75@ 16 75
Tennessee " "	15 50@ 16 00
Lake Superior " "	14 00@ 14 50

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Tennessee Charcoal	15 50
Southern Soft No. 1	11 50
Southern Soft No. 2	11 50
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Southern Coke No. 2 Foundry	9 25@ 9 50
Southern Coke No. 3 Foundry	8 75@ 9 00
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Car Wheel	15 00@ 15 50
Spathite	11 25@ 11 75

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Southern Coke No. 2	10 25@ 10 75
Southern Coke No. 3	9 75@ 10 00
Southern Gray Forge	9 50@ 9 75
Southern Charcoal No. 1	14 00@ 14 50
Missouri Charcoal No. 1	12 50@ 13 00
Ohio Softeners	14 00@ 14 50
Lake Superior	15 50@ 16 00
Southern	16 75@ 17 00
Connellsville Coke, St. Louis	4 50

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No. 1 R. R. wrought scrap	$ 9 50
No. 1 wrought scrap	8 50
No. 1 Machine cast scrap	8 50
Iron axles	15 50
Axle turnings	8 00
Wrought turnings (free from cast)	6 50
Cast borings	5 50
Uncut wrought iron boilers	4 00
Steel boiler plates	8 00
Grate bars	5 50
Pipes and flues (clean)	7 00
Tank iron	6 75
Hoop and band iron	6 00
Sheet iron	5 00
Wrought drillings	6 50
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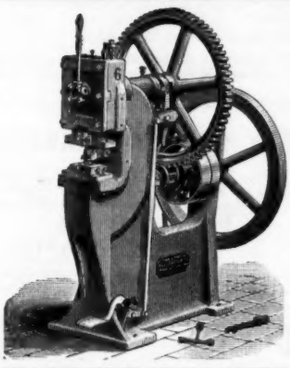

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A. H. LEITCH, PRES JOHN C. LEITCH, SEC. AND GENL. MAN. JOHN A. WILSON, TREAS.

WESTMORELAND FIRE BRICK CO.
MANUFACTURERS OF HIGH GRADE FIRE BRICKS.
PITTSBURG, PA.
Works and Mines, Westmoreland, Pa.

PL DIXON'S PERFECT LUBRICATING GRAPHITE.
The most Marvelous Lubricant Known.
Used Dry, or Mixed with Water, Oil or Grease
NOT AFFECTED BY HEAT, COLD, STEAM OR ACIDS.
An Interesting and Instructive Pamphlet will be sent Free of Charge.
JOS. DIXON CRUCIBLE CO. Jersey City, N. J.

IRON CLAD PAINT CO.
Factory, 75 & 77 Central Way. Sec. & Treas., No. 3 Case Build'g,
CLEVELAND, OHIO.

ORDER DIRECT FROM THE
Iron Clad Paint Co.
And get the genuine article, and save liability of suit for using an article made in violation of the patents issued to Wm. Green, and now owned by this Company.
IRON CLAD PAINT is the most durable, most fire-proof and Cheapest Paint made.
FURNISHED both Dry and Ground in Oil
USED BY NEARLY ALL THE RAILROADS.

Subscribe for the Iron Trade Review, $3 per year.

STRUCTURAL MATERIAL.

Beams and Channels (f. o. b. mill)	1.25C@1.35C
Angles	1.20C@1.25C
Tees	1.35C@1.45C
Universal Plates	1.20C
Sheared Plates	1.30C

MERCHANT IRON AND STEEL.

[List prices out of store.]

Flat Bar.

1½ to 4 by ⅜ to 1 inch	1 30
4½ to 6 by ⅜ to 1 inch	1 35
1¾ to 6 by 1⅛ to 2 inch	1 50
1¼ & 1⅜ by ⅜ to ¾ inch	1 35
1 & 1⅛ by ⅜ to ¾ inch	1 40
⅛, ⅜, ⅞, by ⅜ to ⅝ inch	1 50

Round and Square.

1 to 1⅞ inch	1 30
2 to 2⅝ inch	1 40
2¾ to 3¼ inch	1 55
3⅜ to 4 inch	1 80
4⅛ to 4½ inch	2 40
4¾ to 5 inch	2 60

Oval.

⅜ to 1¼ inch	1 50
⅝ to ¾ inch	1 50
½	1 70
⅜	1 90

Half Oval and Half Round.

1¼ to 3 inch	1 85
⅞ to 1½ inch	1 65
⅝ to ¾ inch	1 90
½	2 05
⅜	3 15

Heavy Band.

1¾ to 6 by ¼ and 5-16 inch	1 40
1 to 1⅜ by ¼ and 5-16 inch	1 45
¾ to ⅞ by ¼ and 5-16 inch	1 55
½ to ⅝ by ¼ and 5-16 inch	1 80

Hoop Iron.

1 7-16 to 4, No. 13, 14, 15 and 16	1 85
1 7-16 to 2, No. 17, 18 and 19	1 90
1 7-16 to 2, No. 20	2 00
1 7-16 to 2, No. 21	2 10
1 7-16 to 2, No. 22	2 20
1½ to 1⅜, No. 13, 14 and 15	1 90
1½ to 1⅜, No. 16, 17 and 18	1 95
1½ to 1⅜, No 19 and 20	2 00
1½ to 1⅜, No. 21	2 10
1½ to 1⅜, No. 22	2 20
15-16 and 1 inch, No. 13, 14 and 15	1 85
15-16 and 1 inch, No. 16, 17 and 18	2 00
15-16 and 1 inch, No. 19 and 20	2 10
15-16 and 1 inch, No. 21	2 20
15-16 and 1 inch, No. 22	2 30
⅞, No. 13, 14 and 15	2 10
⅞, No. 16, 17 and 18	2 20
⅞, No. 19 and 20	2 30
⅞, No. 21	2 40
⅞, No. 22	2 50
13-16, No. 13, 14 and 15	2 20
13-16, No. 16, 17 and 18	2 30
13-16, No. 19 and 20	2 40
13-16, No. 21	2 50
13-16, No. 22	2 60
¾, No. 13, 14 and 15	2 30
¾, No. 16, 17 and 18	2 45
¾, No. 19 and 20	2 55
¾, No. 21	2 65
¾, No. 22	2 75
11-16, No. 13, 14 and 15	2 55
11-16, No. 16, 17 and 18	2 60
11-16, No. 19 and 20	2 70
11-16, No. 21	2 80
11-16, No. 22	2 90
11-16, No. 23	3 00
⅝, No. 13, 14 and 15	2 60
⅝, No. 16, 17 and 18	2 70
⅝, No. 19 and 20	2 80
⅝, No. 21	2 90
⅝, No. 22	3 00
⅝, No. 23	3 10
9-16, No. 13, 14 and 15	2 80
9-16, No. 16, 17 and 18	2 90
9-16, No. and 20	3 00
9-16, No. 21	3 10
9-16, No. 22	3 20
9-16, No. 23	3 30
7-16 and ½ inch, No. 13, 14 and 15	3 00
7-16 and ½ inch, No. 16, 17 and 18	3 10
7-16 and ½ inch, No. 19 and 20	3 20
7-16 and ½ inch, No. 21	3 30
7-16 and ½ inch, No. 22	3 40
7-16 and ½ inch, No. 23	3 50
⅜, No. 13, 14 and 15	3 50
⅜, No. 16, 17 and 18	3 60
⅜, No. 19 and 20	3 70
⅜, No. 21	4 00
⅜, No. 22	4 10
⅜, No. 23	4 25

Light Band.

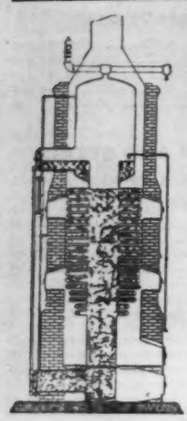
1½ to 6 by ⅛ to 3-16 inch	1 60
1½ to 6 by Nos. 11 and 12	1 65
1 to 1⅜ by ⅛ to 3-16 inch	1 65
1 to 1⅜ by Nos. 11 and 12	1 70
⅞ and 13-16 by ⅛ to 3-16 inch	1 80
⅞ and 13-16 by Nos. 11 and 12	1 85
¾ and 11-16 by ⅛ to 3-16 inch	1 90
¾ and 11-16 by Nos. 11 and 12	1 95
⅝ and 9-16 by ⅛ to 3-16 inch	2 05
⅝ and 9-16 by Nos. 11 and 12	2 10
½ by ⅜ to 3-16 inch	2 20
½ by Nos. 11 and 12	2 25

Wagon Box Iron.

⅞ inch, beveled edge, by Nos. 11 and 12	1 80
⅞ inch, " " " " 13 and 14	1 90
¾ inch, " " " " 11 and 12	1 95
¾ inch, " " " " 13 and 14	2 15

Sheet Iron.

No. 10	1 85
No. 12	1 90
No. 14	1 95



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WATER TUBE BOILER.

This Boiler is absolutely safe from explosion. Gives as much steam from the waste heat as any boiler made. Easy of access for cleaning and repairs. Furnishes perfectly dry steam. Occupies little ground space. Economical in first cost. Send for complete circulars giving list of users and testimonials, one of which is printed below.

The Falcon Tin Plate & Sheet Co., }
NILES, O., Aug. 18, 1893. }

Chas. P. Adams, Esq.

Dear Sir: The three boilers of 225 H. P. each which you furnished us are working in every way satisfactory. We consider them as good steamers as any we have ever used. Up to the present time have spent nothing on them for repairs. Very respectfully,

THE FALCON TIN PLATE & SHEET CO.,
By Warner Arms, Pres't.

C. P. ADAMS.
807 The Cuyahoga, - CLEVELAND. O.

C. W. HUNT COMPANY,
45 Broadway, New York,

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For Hoisting and Conveying Purposes.

SECTIONAL TRACK, INDUSTRIAL AND CABLE RAILWAYS.
BARROWS, COAL BUCKETS, WIRE ROPE, TIP CARS, ETC.

Manufacturers' Tool Supply Co.,

DEALERS IN A FULL LINE OF

MACHINISTS' SUPPLIES.
No. 17 South Canal Street, Chicago.

Morse Twist Drills, Kearney & Foot's Files. Wiley & Russell's Lightning Screw Plates, etc , Billings & Spencer's Wrenches, etc.

CLEVELAND ROLLING MILL CO.,
CLEVELAND, - OHIO,

—MANUFACTURERS OF—

BESSEMER AND OPEN-HEARTH STEEL,

Blooms, Billets, and Slabs, Steel Rails, Steel Beams, Channels and Angles. Steel Forgings, Bar Spring, and Sleigh Shoe Steel. Steel Wire of all kinds. Barbed Wire, Iron and Steel Plates, Galvanized and Black Sheet Iron and Steel Corrugated Iron Roofing.

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We are the only Steel Roofing Co. awarded Medal and Diploma for **PATENT CAP ROOFING** at World's Columbian Exposition. We are also large manufacturers of all styles of METAL ROOFING, SIDING, CEILING, ETC. Send for Catalogue and Price List. Mention this paper.

SYKES IRON & STEEL ROOFING CO., - Chicago and Niles, O.

Moffet Portable Drill

UNSURPASSED AS A REAMER.

Weighs 48 pounds and drills from ⅜ to 2 inches diameter.

Runs with Steam or Compressed air.
Will Work in Any Position.
An Economical Substitute for Rachet Drilling.
Send for Circular.

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J. G. TIMOLAT
189 and 91 S. Fifth Ave., NEW YORK.

Bolt and Nut Works.

THE UPSON NUT CO., Manufacturers of Nuts, Washers, Carriage, Machine, Plow and Elevator Bolts, Coach Screws, etc.

Steel Stamps and Stencils.

FLEHARTY, J. H. & Co., Rubber Stampes Seals, Stencils, Automatic Check Punches, and Numbering Machines. 92 Seneca St.

No. 15-17	2 05
No. 18	2 20
No. 20	2 30
No. 22-24	2 40
No. 25.26	2 50
No. 27	2 60

Steel Boiler Plates—1-4 in. and Heavier.

Tank	1 60
Shell	1 85
Flange	2 10
Marine Flange	2 35
Fire Box	3 35

Above includes plates 90 inches wide.

90 to 96 in. wide	½c. ℔. extra
96 to 100 in. wide	1 c. "
100 to 104 in. wide	1½c. "
104 to 106 in. wide	special

American Cast Tool Steel.

ROUND, SQUARE AND OCTAGON.	cts. ℔s.
1 to 2 in. inclusive	08
9-16 to ½ in. "	08½
7-16 to ⅜ and 2⅜ to 3 in	09
3⅛ to 4 in	09½
⅝ to 11-16 and 4½	10
⅛ to 6 in	10½
¼ to 9-32 and 6¼ to 7 in	11
3-16 in	13

Flats.

	cts. ℔s.
2 to 9-16 in. wide by 2 to ⅝ thick	8

Bessemer and O. H. Steel.

Machinery	base price,	1 80
Tire	"	1 85
Spring	"	2 20
Sleigh Shoe	"	2 20
Toe Calk	"	2 05
Cutter Shoes, tapered and bent	"	2 45

English Tool Steel.

Jessop's	15½c
Hobson's "Best"	15½c
" "Choice"	35c

Burden Boiler Rivets.

½, ⅝, 11-16 and ¾ inches diameter	3 70
Bridge ½, ⅝, 11-16 and ¾ inch diam	3 40

MACHINERY SUPPLY MARKET.

Anvils.

American	℔ 9@10
Wright's	℔ 12

Bellows.

Blacksmiths'	Hill's	dis 40
	Bullock's	dis 50&10
Moulders'		dis 40@40&10
Hand		dis 40&10@50

Belting.

Boston Belting Co.'s standard	dis 70
" " " extra	dis 60&5
" " " best	dis 55
Cleveland Rubber Co. extra standard	dis 60&10
Hoyt's Short Lap	dis 45
Shultz Raw Hide Leather Belting, single	dis 40
Munson's Short Lap Single Leather	dis 50
Munson's Short Lap Double and Light Double Leather	dis 50&10
Shultz Raw Hide Leather Belting, Double and Light Double	dis 40
Standard, oak tanned	dis 50&10
Alexander Brothers' pure oak tanned	dis 45

Blowers and Exhausters.

B. F. Sturtevant's	dis 20
Boston Blower Co.,	dis 35
Buffalo	dis 40

Chucks.

Cushman's 4 Jaw Independent	dis 45
" Combination	dis 40
" Geared Scroll	dis 30
" 2 Jaw Brass Workers	dis 30
" Drill	dis 35
Wescott's Scroll Combination	dis 33⅓
" Independent	dis 40
" Little Giant Drill	dis35
Horton's Universal	dis40
" Independent	dis 45
Whiton's Independent	dis 45
National Combination	dis 40
Sweetland "	dis 40
Almond Drill	dis 20
Morse "	dis 15
Skinner's Combination Lathe	dis 40&10
" Independent Lathe	dis 40&10
" Universal Lathe	dis 40&10
" Drill	dis 20

Cutters and Reamers.

Cleveland	dis 10@15
Pratt & Whitney	dis 10@15
Standard	dis 10@15
Morse	dis 15
Brown & Sharpe, Milling Cutters	dis 15
" " Gear Cutters	dis 15

Crowbars.

Cast Steel	℔ 3½
Iron, steel points	℔ lb 3

Drill and Drill Sockets.

Twist Drills	dis 50&10
Morse Taper and Straight Shank to 1½"	dis 50&10
Morse Taper and Straight Shank Larger than 1½"	dis 25
Drill Sockets	dis 25
Standard Twist Drills	dis 55@55&5
Cleveland " "	dis 55@55&5

Emery.

	No. 4 to No. 54 46 gr.	150 gr.	Flour, C. F F. FF.
Kegs, ℔	4½c	5 c	2½c
½ kegs ℔	4¾c	5¼c	2¾c
¼ kegs ℔	5 c	5½c	3 c
10 ℔ cans, 10 in case	6 c	6½c	5 c
10 ℔ cans, less than 10	10 c	10 c	7½c

ALBANY, N. Y.

RECEIVER'S SALE

OF

VALUABLE PROPERTY.

A Grand Opportunity to Purchase a Manufacturing Plant Cheap.

Taxes Low, Insurance Low. The Town will Offer Many Inducements.

Henry L. Smith, Receiver of the Albany Horse Nail Company, offers for a limited time at private sale, the following:

Lot 367 ft. x 307 ft. 9 in., upon the bank of the Hudson River, and in addition, land under water to center of channel of river. Lot contains one main building 52 ft. x 208 ft. Slate roof, wood and iron frame, solid brick floor, office and store rooms; thoroughly equipped with steam heat, independent water supply, first-class drainage. Also one brick and iron roof boiler house adjoining main building. Main building contains one compound Duplex Engine, 200 horse-power, of the very best and latest make, with all modern appliances; 200 feet of main shafting with pulleys, cups and all complete. Boiler house contains two 100 horse-power boilers with all modern appliances.

Everything new, foundation of engine, setting of boilers and all detail thoroughly first-class.

Location just across Albany city line on the bank of the Hudson River. Dock privileges within 75 feet, and D. & H. C. Co. branch track within 60 feet of building. No cartage. Title absolute.

Property must be sold. Correspondence solicited. Receiver will give all information, and invites inspection.

Will sell separately or with the plant the following:

Large quantity of counter shafting. Foster air pump No. 2. Sturtevant blower No. 8, noiseless, with counter shaft. Three nail pointing machines, one sifter and one tumbler, all new; also 15 tons blank nails made from the S. W. R. brand Swedish steel. Grindstone and solid oak frame, stone 6½ inch face and 6 feet diameter. Weight of stone 2,026 lbs. Emery wheels with table. Two Superb oil tanks, designed to contain oil for fuel. Dimensions, 6 ft. diameter, 24 feet long. Bumptead heads, man hole, caulked inside and out. Perfectly tight and guaranteed under pressure of 30 lbs. All of the above absolutely new, never used, all in good condition. Also many miscellaneous tools, scales, etc., etc. All new.

Entire plant suitable for almost any large manufacturing.

Address or call upon

HENRY L. SMITH, Receiver,

50 State Street, Albany, N. Y.

Emery Cloth and Paper.

Barder, Adamson & Co.....dis 50@50&5
H. H. Barton.....dis 50@50&5

Emery Wheels.

Detroit.....dis 60@70
Norton's.....dis 60@70
Grant.....dis 60@70
Sterling.....dis 60@70
Celluloid.....dis 10&33⅓
Northampton.....dis 55
Crystal.....dis 65@70
Vitrified.....dis 60@70
Vulcanite.....dis 60&10
Hamden.....dis 60&10@70
Cyclone.....dis 60@60&10

Files.

Arcade.....dis 60&10@60&10&10
Nicholson.....dis 60&10@60&10&10
" X. F.....dis 25
Kearney & Foot.....dis 60&10@60&10&10
Black Diamond.....dis 60&10@60&10&10
McClellan.....dis 60&10@60&10&10
Disston's.....dis 65@70
Western.....dis 70
Stub's.....dis 25
Grobet's.....dis 30
Reynolds Bros.' Hand Cut.....dis 50
Industry File Works Hand Cut.....dis 50

Hammers.

P. S. W.....dis 40
Atha new list, Jan. 15, 1887.....dis 50
Heavy hammers and sledges under 5 lbs.....12c
" " " " over 5 lbs.....10c

Jack Screws.

Illinois Bolt Co. list.....dis 75

Nuts and Washers.

Size of bolt inches	¼	5-16	⅜	½	⅝	¾	1
Square	8	7	5½	4¼	4	3½	3½
Hexagon	15½	11½	8½	6	5¼	5¼	
Washers	9	8	7	5	4½	4½	4½

In lots less than 100 lbs, ₩ lb add ½c., 1 lb boxes add 1c to list.

Nails (wire).

List July 14, 1887.....dis 85
Standard Penny Nails, ₩ keg card rate
{ Car lots.....$1.10
{ Less than car lots...$1.25

Oilers.

Zinc and Tin.....dis 60
Brass and Copper.....dis 50
Malleable (Hammer's), No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₩ doz.....dis 10@10&10

Packing, Steam.

Boston Belting Co.....dis 60
American Packing Hemp.....₩ lb 9@10
Russia " " .....₩ lb 14
Italian " " .....₩ lb 13@19
Plumbago Piston.....₩ lb 40
Peerless.....₩ lb 60
Morrison's " .....₩ lb 45
Square Flax " .....₩ lb 50
Sheet Rubber.....₩ lb 12&24
Excelsior Rubber.....₩ lb 48
Rainbow.....{ Full Rolls.....45c ₩ lb
{ Less than Full Rolls. 50c ₩ lb
Eclipse Gasket.....₩ lb 75

Picks.

Railroads, 5 to 6 lbs.....$12 dis 60
" 6 to 7 lbs.....$13 dis 60

Pulleys.

Iron Pulleys, Walker List.....dis 50
Medart Pulleys.....dis 50
Split Wood Pulleys.....dis 55@60

Rivets.

Iron, Thousand, list November 17, 1887 dis 50&10@60
Iron, Ordinary, Cooper's Block and Carriage list November 17, 1887.....dis 50&10@60
Copper.....dis 50@50&10

Saws.

Disston's Circular.....dis 40&10
" Band.....dis 25
" Scroll.....Net
Hack Saw Stubs.....dis 20
" " Eureka.....dis 20
" " Star.....dis 20
Saw Swages Diston's.....dis 30
Atkins' Circular Saws.....dis 40&45
" Mill, Mulay and Drag Saws.....dis 40&10
" Wood Saws.....dis 40&10
" Silver Steel Diamond Cross-cut Saws.....70c per ft
" Dexter Cross-cuts.....30c "
" Diamond " .....30c "
" Tuttle Tooth Cross-cuts.....25c "
" One-man Cross-cuts.....32c "
No. 1 Handles.....23c per pair
No. 6 " .....16c "
Excelsior Saw Tools.....$6 per doz
Derfection " .....$15 "
Petroit Saw Works, Circular.....dis 50
" " " Band.....dis 25
" " " Mulay.....dis 45

Taps.

Cards, Hand and Nut to 2 in.....dis 50
Carpenters' " " " .....dis 50
Morse " " " .....dis 50
Pratt & Whitney " " new list.....dis 10
Machine Screw Taps.....dis 55
Pipe Taps to 2½ in.....dis 70
Stay Bolt Taps.....dis 25
Stove Bolt Taps.....dis 55
Pulley Taps.....dis 40

Vises.

Solid Box.....dis 60
Parker's.....dis 20@25
Prentiss.....dis 20
Stephen's.....dis 25@30
Barrett's.....dis 30
Miller's Falls.....dis 40
Merrill's.....dis 15@20
Howard.....dis 35

Wire.

New List, Apr. 9, 1894

Brass	dis 40
Copper	dis 40
Bright and annealed, Nos. 0@18	dis 70&10@75
" " Nos. 19@26	dis 75@75& 5
" " Nos. 27@36	dis 75&10& 5
Coppered Nos. 0 to 18, market list	dis 70@70& 5
Galvanized Nos. 0 to 18 " "	dis65& 5
Tinned market Nos. 0 to 18	dis 67½
Cast steel	dis 50
Tinned Broom Wire	dis 70&5@70&10
Annealed Fence, Nos. 8 and 9	dis 75
Annealed Grape, Nos. 10 to 14	dis 75
Stub's Steel Wire regular	95c ₩ ℔ dis 30

Wrenches.

Coe's genuine	dis 50
Girard Standard	dis 70&10
Agricultural	dis 75&10
Mechanic's	dis 55&10& 5
Bemis & Call's Combination	dis 35
Donohue's Engineers	dis 20&10
Lamson & Sessions Engineers	dis 60
Billings & Spencer's Drop Forged	dis 25
William's " "	dis 25
Alligator " "	dis 40

Cleveland Union Station.

Pennsylvania Lines.

Foot of Bank Street.

TICKET OFFICES at Station, Euclid Av., Woodland Av., and Weddell House corner.

THROUGH TRAINS RUN AS FOLLOWS BY CENTRAL TIME
* Daily. † Daily, except Sunday.

FROM CLEVELAND TO	LEAVE	ARRIVE
Pittsburgh and Bellaire	† 7.45 am	†11.55 am
Pittsburgh, Bellaire and East	†12.45 pm	† 6.35 pm
Philadelphia and New York	* 1.40 pm	*11.15 am
Baltimore and Washington	* 1.40 pm	*11.15 am
Alliance and Pittsburgh	* 1.40 pm	*11.15 am
Ravenna and Alliance	† 3.25 pm	† 9.50 am
Hudson and Ravenna	* 5.10 pm	* 8.15 am
Philadelphia and New York	*11.10 pm	* 5.25 am
Baltimore and Washington	*11.10 pm	* 5.25 am
Alliance and Pittsburgh	*11.10 pm	* 5.25 am

Mt. Vernon and Pan-Handle Route

FROM CLEVELAND TO	LEAVE	ARRIVE
Xenia and Cincinnati	* 8.4c am	* 5.15 pm
Akron, Columbus & Zanesville	†12.45 am	*11.55 pm
Akron and Columbus	* 8.40 pm	*5.15 pm
Akron and Orrville	† 3.25 pm	† 9.50 am
Columbus and Cincinnati	* 8.00 pm	* 7.00 am

Valley Ry.

Depot foot of So. Water St.
City Office 143 Superior St.

	Arrive.	Depart.
Akron & Canton	*6:35 P M	*7:10 A M
Akron, Canton & Valley Jctn.	*10:10 A M	*3:15 P M
Valley Jctn. & Way Stations	†6:35 P M	†7:10 A M
Akron, Canton & Chicago	*8:00 A M	*6:30 P M
Wooster and Garrett	†3:00 P M	†11:00 A M
Wooster	.....	*6:30 P M
Akron, Canton & Marietta	†3:00 P M	†11:00 A M
Steubenville, Wheeling, Washington, D. C., and Baltimore	†3:00 P M	†11:00 A M

†Daily except Sunday. *Daily. Pullman's Palace Vestibule Drawing Room cars between Cleveland and Chicago.

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PATENT VERTICAL

WATER TUBE

BOILER.

SAFE,

ECONOMICAL,

DURABLE.

The best boiler made for the use of gaseous fuel at blast furnaces, puddling and heating furnaces.

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Sharon, Pa.

Room 508, Cuyahoga Building, **Cleveland, Ohio.**

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ENGINEERS.

Mining Reports and Estimates. **Spanish-American Business a Specialty.**

STEEL, IRON, COPPER, ZINC, BRASS, TIN,

And all Other Metals Perforated as Required for

GRAIN CLEANING AND MINING MACHINERY,
WOOLEN, COTTON, PAPER AND PULP MILLS,
RICE, FLOUR AND COTTON SEED OIL MILLS,
SUGAR AND MALT HOUSES, DISTILLERIES, FILTER PRESSES,
STONE, COAL AND ORE SCREENS,
BRICK AND TILE WORKS, FILTERS,
SPARK ARRESTERS, GAS AND WATER WORKS,
OIL, GAS AND VAPOR STOVES,
COFFEE MACHINERY, ETC., ETC.

STANDARD SIZES PERFORATED TIN AND BRASS ALWAYS IN STOCK.

THE HARRINGTON & KING PERF. CO.,

Main Office and Works, 222 to 240 N. Union St., Chicago, Ill., U. S. A.

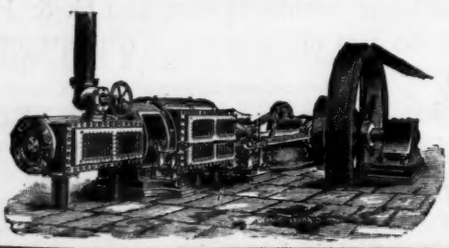
Eastern Office, No. 284 Pearl St., New York.

WILLIAM TOD & CO.

YOUNGSTOWN, OHIO.

THE PORTER-HAMILTON ENGINE

SINGLE, COMPOUND & CONDENSING



Blowing Engines.

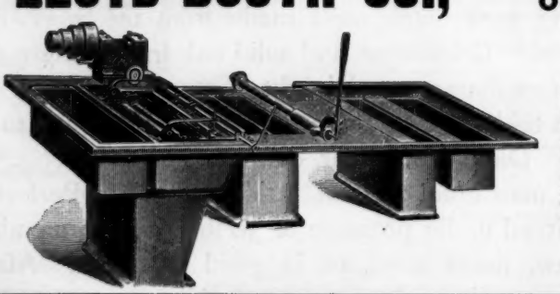
Hydraulic Cranes and Accumulators.

Heavy Special Machinery.

ENGINE CATALOGUE ON APPLICATION

THE LLOYD-BOOTH CO., YOUNGSTOWN, OHIO.

Tinning MACHINERY



Rolling Mills, Sand and Chill ROLLS.

POWER From **GAS OR GASOLINE.**

No Steam, Coal, Ash, Gauges, Engineer nor Danger.

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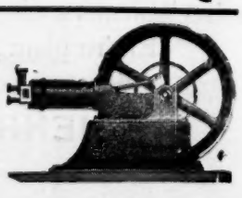

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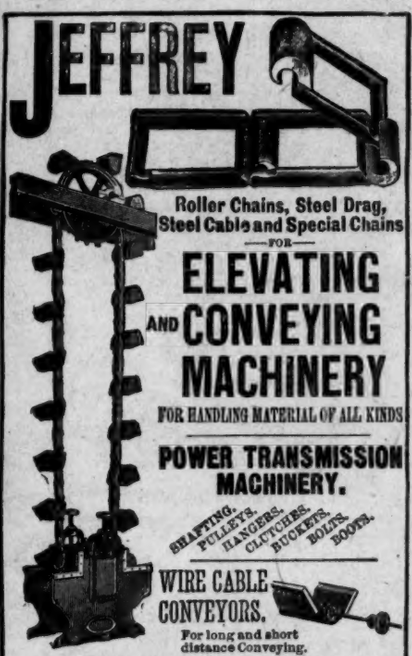

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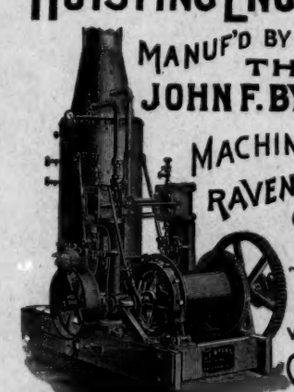

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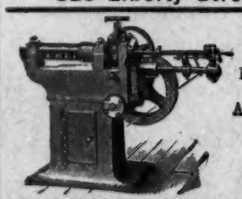

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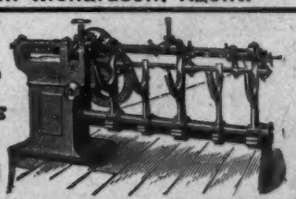

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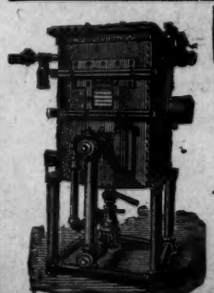

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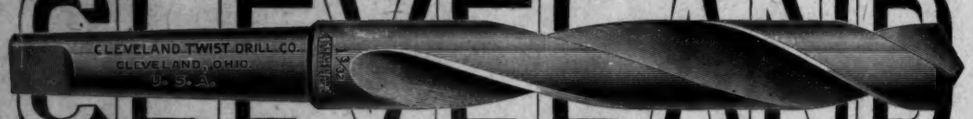

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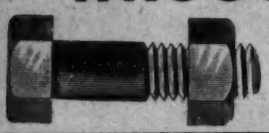

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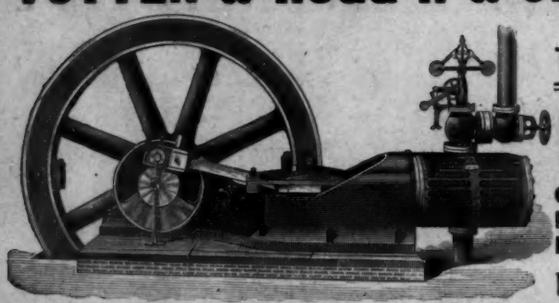

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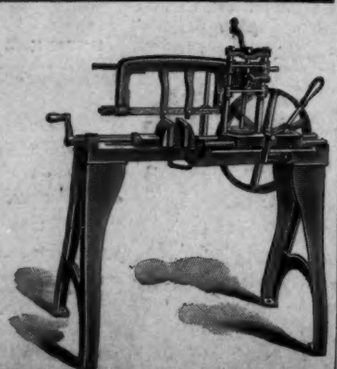

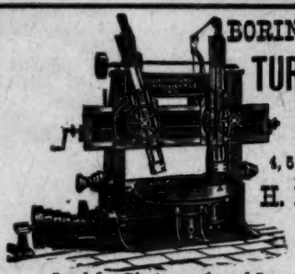

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